Climate Change v Eurozone Crisis: Social and Economic Views of Risk in Inter-Expert Risk Communication

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Abstract

This DPhil thesis discusses how two divergent risk conceptions, a 'social view' and an 'economic view' of risk, are constructed through inter-expert risk communication. Different and sometimes contradictory concepts of risk are mobilised in regulatory practice, but the origins of these divergent risk conceptions are not extensively studied. This thesis seeks to unpack this divergence.

Empirically, I analyse risk communication among experts in the European Union (EU) during the creation of two risk regulation standards. The two case studies, one related to the development of the two-degree target of EU climate policies (the climate case) and the other about the negotiation of the excessive deficit criteria of the Maastricht Treaty (the euro case), can shed light on the relations between risk conceptions and inter-expert risk communication. I argue that through risk communication, an initial 'view' of risk can be entrenched and developed into a paradigmatic 'risk conception'. My analysis uses historical and sociological institutionalism, by focusing on path dependence of risk communication and social construction risk conceptions among EU experts.

Through the two case studies, I identify four analytical dimensions of inter-expert risk communication: *networks* (the institutional setting and relationships between different experts), *cultures* (the mentalities of experts in relation to discussing risks), *dynamics* (the actual processes of transmitting and receiving risk messages) and *strategies* (the rationales supporting the decisions of risk regulation standards). My thematic analysis reveals four key distinct 'features' of social/economic views of risk: *expertise* (the types of knowledge mobilised), *normality* (characterising risk as either 'special' or 'routine'), *probability* (considering risk as either uncertain or calculable) and *impact* (seeing risk as either negative or positive). I argue that these four features can help explain the construction of risk conceptions, and more broadly, provide an analytical framework for studying how views of risk evolve and interact over time.

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Contents

Abbreviations

AGBM	Ad hoc Group on the Berlin Mandate
AGGG	Advisory Group for Greenhouse Gases
CAC	Codex Alimentarius Commission
CBA	Cost-benefit analysis
CLRTAP	Convention on Long-Range Transboundary Air Pollution
CoG	Committee of Governors of Central Banks
COP	Conference of Parties (of the UNFCCC)
Coreper	Committee of Permanent Representatives
DG	Directorate-General of the European Commission
EC	European Communities
ECB	European Central Bank
Ecofin Council	Economic and Finance Council of the European Union
EDP	Excessive Deficit Procedure
EEA	European Environment Agency
EEA-TF	European Environment Agency Task Force
EFSA	European Food Safety Authority
EMS	European Monetary System
EMU	Economic and Monetary Union
ERM	Exchange Rate Mechanism
EU	European Union
GDP	Gross domestic product
GHGs	Greenhouse Gases
GMO	Genetically modified organism
GMU	German Economic and Monetary Union
IGC	Intergovernmental Conference (of the EU)
IIASA	International Institute for Applied Systems Analysis
IMAGE	Integrated Model to Assess the Global Environment
IPCC	Intergovernmental Panel on Climate Change
MC	Monetary Committee
NRC	National Research Council (US)
OCA	Optimal Currency Area

OECD	Organisation for Economic Co-operation and Development
PBL	Netherlands Environmental Assessment Agency
PIK	Potsdam Institute for Climate Impact Research
PP	Precautionary principle
RAINS	Regional Air pollution Information and Simulation Model
RIVM	National Institute for Public Health and the Environment
SAR	Second Assessment Report of the IPCC
SARF	Social Amplification of Risk Framework
SGP	Stability and Growth Pact
SLA	Safe landing analysis
SPM	Summary for Policymakers of the IPCC Reports
TEC	Treaty Establishing the European Community
TEU	Treaty on European Union
TFEU	Treaty on the Functioning of the European Union
TWA	Tolerable Windows Approach
UNECE	United Nations Economic Commission for Europe
UNFCCC	United Nations Framework Convention on Climate Change
WBGU	German Advisory Council on Global Change
WTO	World Trade Organization

Tables and Figures

Chapter 1
A Tale of Two Risk Conceptions

My ventures are not in one bottom trusted,
Nor to one place; nor is my whole estate
Upon the fortune of this present year:
Therefore my merchandise makes me not sad.[1]

Antonio, the merchant of Venice, was not emotionally bound to his business because it was insured through diversification. The concept of risk has an economic root in maritime trade and the development of insurance.[2] Business people like Antonio tend to think of risk as an uncertain opportunity, which, if managed well, can bring potential profits.

This early economic reading of risk, however, has evolved over time. The modern concepts of risk in non-business scenarios are often linked with the notions of danger and unwanted consequences.[3] Many people, unlike Antonio, feel worried about the uncertainty of risk and focus on controlling the down-side of risk. The ways how we perceive risks in the modern world are diverging.

My DPhil thesis is inspired by this divergence. On the one hand, there is an *economic view of risk* that associates risks with manageable uncertainties and opportunities. This economic view originates from the private sector, in particular from the fields of business and finance, and people talk of 'risk management' as a necessary process to minimise costs and maximise profits. On the other hand, from a

[1] William Shakespeare, *The Merchant of Venice*, Act 1, Scene 1, 45-48.

[2] Peter L Bernstein, *Against the Gods: The Remarkable Story of Risk* (New Ed, John Wiley & Sons 1998), 1-22.

[3] Deborah Lupton, *Risk* (2nd edn, Routledge 2013) ch 1. Lupton describes the modern concept of risk as 'widely used to explain deviations from the norm, misfortune and frightening events' (Ibid 3).

more collective or societal perspective, the *social view of risk* considers risks as potential hazards that may materialise in the future, which have to be avoided. This social view thus focuses 'risk regulation' on mitigating or reducing negative impacts. To rephrase this in a simplified dichotomised way, the 'economic view' links risks with potential profits, considers risk management as individual/organisational decisions, and operates mainly in private scenarios, whereas the 'social view' sees risks as potential danger, requires collective evaluation of the risk acceptability of the society, and operates predominately in the public sphere. There is thus a clear divergence between the 'positive' economic view and the 'negative' social view toward risks.

The economic and the social views may be diverging and incompatible in their most simplified, purest forms, but why should we care about this divergence? If the so-called economic view is adopted primarily in the private sector, among companies and business people, while the alleged social view operates mostly in the public sphere, in a collective manner, why should we worry about this 'divergence' and any potential 'incompatibility'? After all, these two views are mobilised in completely different contexts.

My answer to this 'so what' question, as I will explain in detail in Section 1, is that for the purpose of regulation, both views of risk are mobilised in risk regulatory regimes, and their potential incommensurability marks a fundamental challenge to modern risk regulation that has not yet been extensively investigated. While research has shown that there are different ways to define and understand risks in regulation,[4] less is known about how exactly these two divergent views operate in risk regulatory

[4] Elizabeth Fisher, 'Risk Regulatory Concepts and the Law' in OECD (ed), *Risk and Regulatory Policy: Improving the Governance of Risk* (OECD 2010); Julia Black, 'The Role of Risk in Regulatory Processes' in Robert Baldwin, Martin Cave and Martin Lodge (eds), *The Oxford Handbook of Regulation* (OUP 2010).

practices. My thesis therefore seeks to clarify these two views, and to argue that, through the process of risk communication, a particular 'view' of risk can pave a specific 'path' to the development of a more paradigmatic 'risk conception'.

By 'paradigmatic' I mean that a specific understanding of risk becomes the dominant, standardised view that guides the decisions of experts in regulatory practice in general, and regulatory standard-setting in particular. In order to explore the emergence of the economic and the social views of risk and to explain why they become paradigmatic, I will concentrate empirically on the activities of *inter-expert risk communication*. Expertise plays an important role in regulation, in particular in areas related to 'risk'.[5] Central to the process of risk regulation is 'risk communication', defined as transmission of risk-related information between relevant actors. It is thus logical and crucial to investigate how different experts communicate and conceptualise risks, in order to shed light on the construction of the two divergent conceptions of risk.

The relations between risk communication activities and 'views' of risk will be analysed through the lens of *historical* and *sociological institutionalisms*:[6] on the one hand, I seek to examine the effects of actual risk communication processes, especially the nature of *path dependence*; one the other hand, I try to demonstrate that the two risk conceptions, as institutions, are *socially constructed*. I map social and economic views of risk empirically by analysing the actual processes of risk communication

[5] Ellen Vos and Michelle Everson, *Uncertain Risks Regulated* (1 edition, Routledge-Cavendish 2012); Sheila Jasanoff, *The Fifth Branch: Science Advisers as Policymakers* (Harvard University Press 1998).

[6] Historical institutionalism, sociological institutionalism and rational choice institutionalism are the three schools of 'new institutionalism'. Historical institutionalism explores the interactions between institutions and social actions with a particular focus on temporal sequences, critical junctures and historical trajectories; sociological institutionalism, on the other hand, focuses on the 'cultural' perspective that sees institutions as socially constructed and as 'cognitive scripts' that constrain behaviours. These two institutionalisms will be introduced in Section 3, Chapter 2. For an overview of the three new institutionalisms, see Peter A Hall and Rosemary CR Taylor, 'Political Science and the Three New Institutionalisms' (1996) 44 Political Studies 936.

through which experts think and talk about risks.

To be specific, I will use a comparative method with two case studies, one related to environmental risks (climate change) and the other about economic risks (Eurozone crisis). Furthermore, to confine the case studies to a feasible scope, I will concentrate on risk communication activities among experts related to the making of two sets of *risk regulation standards* in the European Union (EU), i.e. the 2-degree temperature target of EU climate policy (the 2-degree target) and the excessive deficit criteria in the Maastricht Treaty (the fiscal rules). Based on this institutionalist and comparative approach, my analyses will be broken down into four major analytical dimensions of inter-expert risk communication — their networks, cultures, dynamics and strategies.

In this introductory chapter, I will first discuss the two different 'views' of risk, their defining features, and their mobilisation in regulatory practice (Section 1). Then I will provide some arguments for the empirical focus and context of my thesis, i.e. inter-expert risk communication (Section 2). Next, I will introduce and justify the selection of my two case studies about the 2-degree target and the fiscal rules (Section 3). Finally I will give an overview of my DPhil thesis (Section 4).

1. Research Question: Why Risk Conceptions Diverge?

Risk is an elusive concept, and its definition varies. This is because 'risk' can be studied through different theoretical approaches,[7] leading to its 'multi-faceted

[7] Eugene A Rosa, 'Metatheoretical Foundations for Post-Normal Risk' (1998) 1 Journal of Risk Research 15.

conceptualisations'.[8] One can adopt a broad working definition of risk here, as 'the possibility that human actions or events lead to consequences that affect aspects of what human value.'[9] However, one may also argue that a precise definition is not the point, because what makes the study of risk important is 'not risk itself', rather 'the forms of knowledge that make it thinkable'.[10]

My inquiry into different '*views*' *of risk* follows this *constructivist* tradition. Studies of risk can be differentiated into two contrasting academic paradigms: those 'realists' that consider risk as something 'out there' that can be objectively described, and the 'constructivists' who see risk as results of specific representation processes.[11] Since I emphasise that risk is 'socially constructed', it makes sense to pay extra attentions to the 'views' of risk. Furthermore, the two contrasting academic paradigms also seem to have a bearing on views of risk adopted in the practice of risk regulation. I argue that there are two different views of risk, one 'economic' and the other 'social', that dominate risk regulation but are potentially incompatible. The prime objective of this DPhil thesis is *to clarify these two views of risk and to explain how they eventually become paradigmatic risk conceptions.* This section will not only introduce the key features of the social and the economic views of risk in detail, but also explain the 'mobilisation' of both two views in modern risk regulatory practices.

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[8] Wee-Kiat Lim, 'Understanding Risk Governance: Introducing Sociological Neoinstitutionalism and Foucauldian Governmentality for Further Theorizing' (2011) 2 International Journal of Disaster Risk Science 11.

[9] Ortwin Renn, 'Three Decades of Risk Research: Accomplishments and New Challenges' (1998) 1 Journal of risk research 49, 51.

[10] Mitchell Dean, *Governmentality: Power and Rule in Modern Society* (SAGE Publications 1999) 178.

[11] Rosa (n 7) 17–24. Lupton further divides constructivists into 'weak' and 'strong' positions, with the former takes a 'critical realist' approach (such as the cultural theory of risk and the thesis of risk society) and the latter adopts the 'governmentality' approach: Lupton (n 3) 41–51.

1.1 Two views of risk: economic *versus* social

The two 'views' of risk differ in several aspects. Historical studies suggest that the language of 'risk' was developed for the purpose of economic activities.[12] The original concept of risk, as an 'economic' concept, operates predominantly in the private sector. In terms of finance and business management, risk is considered as a tool to facilitate individual decisions in relation to economic activities. Its evaluation is based mainly on *economic expertise*, including cost-benefit analysis, financial models and other actuarial techniques. In this sense, 'risk management' often refers to the decision-making strategy of a firm or a person to evaluate risks, reduce costs and maximise profits.[13] Risk is thus embedded in the decision-making process, as 'side effects' of normal business activities to be managed. In fact, in Knight's often cited work, risk was considered as something by definition *manageable*.[14] Knight made a clear distinction between 'uncertainty', those incalculable factors, and 'risk', which is *calculable* by methods of probability and statistic.[15] Moreover, the OECD also defines risk as 'the measurable probability that the actual outcome will deviate from the expected outcome'.[16] Risk is 'measurable', and its impact is a potential deviation of outcomes, which promotes companies' efficiency.[17] Therefore, through economic analysis and probabilistic techniques, risk can be calculated and 'rationally' managed, in order to reduce side effects and increase profits. In the language of business and

[12] Bernstein (n 2); Vincent T Covello and Jeryl Mumpower, 'Risk Analysis and Risk Management: An Historical Perspective' (1985) 5 Risk Analysis 103.

[13] Aswath Damodaran, *Strategic Risk Taking: A Framework for Risk Management* (Wharton School Pub 2008) ch 1.

[14] Frank H Knight, *Risk, Uncertainty, and Profit* (Houghton Mifflin Company 1921).

[15] ibid.

[16] OECD, *Public-Private Partnerships: In Pursuit of Risk Sharing and Value for Money* (OECD 2008) 48.

[17] ibid 48–49.

finance, risk has a *positive* connotation.

This specific understanding of risk in private business activities has changed and been expanded. Risk bears a more 'social' meaning in the public sphere. This particular view of risk is predominant in public administration. Risk regulation can be defined as 'the exercise of public authority (however broadly construed) with intent to affect the likelihood and/or magnitude of socially undesirable events ("social bads").'[18] In this sense, risks are the subjects of specialised regulatory interventions, something 'out there' to be *regulated*. This social view of risk also tends to focus on 'technological risks'[19], such as pollution, food contamination, health, nuclear power or other issues associated with new forms of technology. Risk is thus not only analysed with the aid of economic expertise, but also evaluated by a wide range of *scientific methods*. Risk regulation, building on early research that talked of regulating 'societal risks'[20] or constructing 'social theories of risk'[21], shares this particular social view and contrasts the scientific assessment of risk with the acceptability of risk to society. As a result, risk is often linked with *scientific uncertainty*, and the scholarly debate hence focuses on resolving (or going beyond) the science/democracy dichotomy.[22] In short, the social view of risk considers controlling risks as the

[18] Veerle Heyvaert, 'Governing Climate Change: Towards a New Paradigm for Risk Regulation' (2011) 74 The Modern Law Review 817, 819; see also Christopher Hood, Henry Rothstein and Robert Baldwin, *The Government of Risk: Understanding Risk Regulation Regimes* (OUP 2001) 3.

[19] For example: Bettina Lange, *Implementing EU Pollution Control: Law and Integration* (CUP 2008); Elizabeth Fisher, *Risk Regulation and Administrative Constitutionalism* (Hart Publishing 2007); Alberto Alemanno, *Trade in Food: Regulatory and Judicial Approaches to Food Risks in the EC and the WTO* (Cameron May 2007); Scott Lash, Bronislaw Szerszynski and Brian Wynne (eds), *Risk, Environment and Modernity: Towards a New Ecology* (SAGE 1996). The body of literature in risk regulation is vast and this is clearly not an exhaustive list. However, it should be noted that the field of 'risk regulation' also covers other issues that are not strictly linked to the use of 'new' technologies, such as natural disasters, lifestyle risks and road safety.

[20] Steve Rayner and Robin Cantor, 'How Fair Is Safe Enough? The Cultural Approach to Societal Technology Choice' (1987) 7 Risk Analysis 3.

[21] Sheldon Krimsky and Dominic Golding (eds), *Social Theories of Risk* (Praeger 1992).

[22] Fisher (n 19) 6–18.

regulatory objective that requires evaluating risk scientifically and determining its acceptability in the society. Risks discussed by the general public, in non-business scenarios, are usually associated with *negative* consequences.

From the above description we can see four major differences between the economic view and the social view of risk: from the perspective of an economic view adopted originally in business settings, risk is analysed mainly through economic methods, conceived as part of business routine to be managed, seen as statistically calculable, and associated with positive opportunities; from the perspective of a publically constructed social view, on the contrary, risk is evaluated by a wider range of expertise, understood as special subjects of regulation, deemed scientifically uncertain, and considered as negative consequences. These two views of risk are diverging and potentially incompatible.

Therefore, I argue that there are four key 'features' that distinguish the diverging risk conceptions. These four features can be understood by asking four questions about risk. 1) *How is risk analysed and evaluated?* This is a question about the use of 'expertise' in risk analysis: experts holding a social view studies risk through a broad range of scientific methods, whereas those with an economic view focuses mainly on economic analysis. 2) *How is risk positioned in relation to regulation?* It is about the 'normality' of risk, i.e. whether risk is considered as something special that requires additional controls, or as part of the normal routine of regulatory practice. 3) *How do experts think about the probabilities of risk?* By defining risk as 'probability×impact', the social view of risk tends to see risk as inherently uncertain, while the economic view of risk often sees risk as by definition measurable or calculable. 4) *How do experts think about the impacts of risk?* Linking closely with the previous question, experts with a social view of risk concentrate only on the negative impacts of risk,

whereas those with an economic view of risk include also the positives into their cost-benefit analysis. Table 1.1 summarises the key differences between the two views of risk, and these four 'features' of risk conceptions will be further discussed in the first section of Chapter 2.

Table 1.1: Four major differences between the two views of risk

	Social view of risk	**Economic view of risk**
How is risk analysed and evaluated?	Risk is analysed through a wide range of scientific methods	Risk is analysed mainly through economic expertise
How is risk positioned in relation to regulation?	Risk is something special that needs to be regulated	Risk is part of the normal routine that can be managed
How do experts think about the probabilities of risk?	Risk is inherently uncertain	Risk is essentially calculable
How do experts think about the impacts of risk?	Risk is negative	Risk can be positive

At this point one may question that although the above exercise shows two very different ways of conceptualising risks, this divergence is not necessarily problematic, since the two views of risk operate mainly in different contexts. However, I argue that clarifying the two divergent risk conceptions is indeed important, because both views of risk are 'mobilised' in the regulatory practice, and hence have become common challenges of risk regulation.

1.2 The mobilisation of the economic *and* social views of risk

Mobilising both economic and social views in risk regulatory practices is a result of an increasingly blurred public/private divide. To be specific, it marks a 'movement' of the originally privately adopted economic view of risk from the private into the public sphere. Such 'movement' is in fact a general theme of modern regulation, sometimes

presented as 'risk-based regulation' or 'new public risk management'.[23] This can be captured by two quite different sociological theories.

The first one is associated with the Foucauldian perspective of 'governmentality'. By studying the 'mentalities of government', Foucault explained how knowledge can be deployed as the 'art of government', with economic expertise as a prime example.[24] The 'discovery' of the economy, as a new way of thinking about power, has shaped the emergence of an 'economic government'.[25] Economic rationality as an art of government is not merely *using* the economic expertise, but also *bringing* the 'economic view' of risk into the realm of public affairs. For example, Ewald argued that insurance, as a 'technology of risk', can be analysed as a new rationality of organising the security of population and politics.[26] In this sense, although the notion of risk in insurance institutions remains an economic one, because risk is defined as 'calculable' and as a form of 'capital', it has entered into the public sphere and become 'collective'.[27] The governmentality thesis can therefore be a key theoretical concept for analysing risk regulation,[28] and it helps to describe how the economic view of risk is 'mobilised' in regulatory practice.

The other theoretical perspective, developed by Polanyi, delineates this 'movement' of the economic view in a rather different way. Unlike Foucault, Polanyi

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[23] Julia Black, 'Risk-Based Regulation: Choices, Practices and Lessons Being Learnt', *Risk and Regulatory Policy: Improving the Governance of Risk* (OECD 2010); Julia Black and Robert Baldwin, 'Really Responsive Risk-Based Regulation' (2010) 32 Law & Policy 181; Michael Power, *Organized Uncertainty: Designing a World of Risk Management* (OUP 2007).

[24] Dean (n 10) 16–18.

[25] ibid 19; Colin Gordon, 'Governmental Rationality: An Introduction' in Graham Burchell, Colin Gordon and Peter Miller (eds), *The Foucault Effect: Studies in Governmentality* (University of Chicago Press 1991) 1, 14–27.

[26] François Ewald, 'Insurance and Risk' in Graham Burchell, Colin Gordon and Peter Miller (eds), *The Foucault Effect: Studies in Governmentality* (University of Chicago Press 1991) 197.

[27] ibid 201–205.

[28] Lim (n 8) 16–17.

in his classic work *The Great Transformation* conceptualised the economy to be 'embedded' in the society.[29] What Foucault described as a 'discovery' and a new form of government rationality is for Polanyi a 'fictitious' and potentially problematic 'dis-embedding' of the economy out of the society.[30] This status of dis-embedded business activities will eventually require a re-embedding 'counter-movement', and as several scholars argued, illustrates the importance of looking at 'society *within* economy' for the purpose of regulating various transnational risks.[31] Through the case of EU regulation of genetically modified organisms, Lange demonstrated that although both 'social' and 'economic' discourses of risk operate in a risk regulatory regime, it is rather difficult to separate them and draw a clear distinction.[32] Others also commented that the embeddedness metaphor is particularly useful in discussing new forms of economic risks such as the management of sovereign debt markets.[33] In short, a Polanyian reading of contemporary transnational risk regulation seems to suggest that the 'economic view' of risk is (re)embedded into the public sphere.

Be it 'economy in society' (the Foucauldian perspective of governmentality) or 'society within economy' (a particular interpretation of the Polanyian embeddedness

[29] Karl Polanyi, *The Great Transformation: The Political and Economic Origins of Our Time* (2nd edition, Beacon Press 2002) ch 4–5.

[30] ibid ch 6.

[31] Bettina Lange, 'After a Romantic Aspiration to Society: Harnessing the Regulatory Capacity of a Social Sphere' in Bettina Lange, Dania Thomas and Austin Sarat (eds), *From Economy to Society? Perspectives on Transnational Risk Regulation* (Emerald 2013) 1.

[32] Bettina Lange, 'From Polanyi to Discourse Theory' in Bettina Lange, Dania Thomas and Austin Sarat (eds), *From Economy to Society? Perspectives on Transnational Risk Regulation* (Emerald 2013) 73.

[33] W Mark C Weidemaier and Mitu Gulati, 'How Markets Work: The Lawyer's Version' in Bettina Lange, Dania Thomas and Austin Sarat (eds), *From Economy to Society? Perspectives on Transnational Risk Regulation* (Emerald 2013) 107; Dania Thomas, 'Sovereign Debt Restructuring in the Eurozone: A Polanyian Reading of Private Law Enforcement' in Bettina Lange, Dania Thomas and Austin Sarat (eds), *From Economy to Society? Perspectives on Transnational Risk Regulation* (Emerald 2013) 135.

metaphor)[34], these two theses provide a theoretical way of talking about mobilising both economic and social views of risk in modern regulatory practices. However, I do not intend to contribute to this meta-theoretical debate in this research. My main point here is rather simple: *the two diverging views of risk are important to fully understand risk regulation, in particular the practice of risk communication*. Economic expertise and cost-benefit analysis are used extensively in many 'social/societal' risk issues such as environmental regulation, while after a series of economic crises, issues such as financial regulation are no longer considered purely 'economic'. Business activities have inspired policymakers and given rise to the concept of 'risk-based regulation', which focuses on efficient and effective allocation of limited resources in the regulatory process as well as promoting private sector styles of risk management practice in regulation carried out by public bodies.[35] This is sometimes described as 'the rise of a "managerial" concept of risk management and the different logics and values which underlie it' in public policy.[36] Moreover, regulatory reforms are moving from 'government' to 'governance', which includes self-regulation and privatisation of public policy institutions.[37] The lines between the conventional private/public divide are diminishing through interactions between various actors in the regulatory process, as the 'regulatory space' literature has depicted.[38] All these phenomena suggest that the two divergent views of risk, the social and the economic ones, are

[34] Lange, 'After a Romantic Aspiration to Society: Harnessing the Regulatory Capacity of a Social Sphere' (n 31) 8.

[35] Bridget M Hutter, 'The Attractions of Risk-Based Regulation: Accounting for the Emergence of Risk Ideas in Regulation' (LSE 2005) Discussion Paper 30; Black (n 23); Black and Baldwin (n 23).

[36] Power (n 23) 3.

[37] David Levi-Faur, 'From "Big Government" to "Big Governance"?' in Levi-Faur (ed), *The Oxford Handbook of Governance* (OUP 2012).

[38] Leigh Hancher and Michael Moran, 'Organizing Regulatory Space' in Leigh Hancher and Michael Moran (eds), *Capitalism, Culture and Regulation* (Clarendon Press 1989) 271.

both mobilised simultaneously in the practice of risk regulation.

So the two views of risk can 'co-exist' in regulatory regimes, but a question remains: why would this mobilisation be problematic? Or in other words, why would mobilising two different views of risk in the same regulatory space be an interesting phenomenon for academic research? Apparently, the discussion of climate change policy, predominantly 'social', has included economic expertise; likewise, the reform of financial regulation, being essentially 'economic', has framed financial risks as social issues. Yet this is exactly the challenge of current risk regulation debates. Two very different views of risk are mobilised simultaneously in a regulatory context, but this phenomenon is not properly addressed. Mixing these two views without actively recognising their fundamental differences is problematic, because the originally 'private' economic view of risk may be incompatible with the social view of risk in the 'public' sphere.

A classic paper by Schulze and Kneese has clearly elaborated this dilemma of putting private/economic risk appraisal into public/social contexts.[39] Using economic analyses, they argued that CBA (labelled as 'benefit-cost analysis' in their paper, somehow suggesting a particular viewpoint of economists that prioritise benefits) should be broadened to incorporate different ethical systems, in order to be applied to societal risk problems. To illustrate their points, they imagined a 'two person society' with individuals A and B, that seeks to make a societal 'risk decision' (for example, building a dam). The classic CBA follows a utilitarian logic that seeks to maximise the sum of all individuals' utilities. In this case, as long as the sum of A and B's

[39] William D Schulze and Allen V Kneese, 'Risk in Benefit-Cost Analysis' (1981) 1 Risk Analysis 81. The discussion below in this paragraph has drawn heavily on this paper. There are of course many other critics about the philosophical foundation of cost-benefit analysis, for a summary of these critics see By Robert H. Frank, 'Why Is Cost-Benefit Analysis so Controversial?' (2000) 29 The Journal of Legal Studies 913.

utilities increase, a decision of risk regulation/management is considered a good one. However, when applying CBA to other ethical systems, different considerations apply. In an egalitarian society, a risk decision passes the CBA test only if it increases the utility of the worst off individual. Hence if B is poorer than A, than the risk decision must maximise B's benefits. In a libertarian society where individual freedoms prevail, a risk decision can only be acceptable if both A and B benefit. This will lead to rejections of risk decision (i.e. not building the dam) in most cases. Schulze and Kneese argue that, through this thought experiment, we can see some problems of applying the private sector CBA to the public sphere. In a private scenario, risks borne by individuals are separable and replaceable. For example, if A wants to hire B to wash the windows of her tenth story flat and B refuses, she can either raise the wage or find someone else. Yet in a public scenario, risks are jointly borne by all individuals in a society collectively. If A wants to build a dam above B's house in a two person society, theoretically B could demand an infinite amount of compensation, eventually preventing the construction of the dam. Therefore, applying the private economic logic of risk directly to the public sphere without any modification will be very problematic for societal risk decision-making.

Back to our discussion about the two diverging views of risk, it can be concluded that while private risks are separable and the economics of CBA follows a utilitarian logic, public risks are joint and a public policy needs to take other ethical systems, such as libertarianism and egalitarianism, into account.[40] Public risk and private risk are, in a sense, *incommensurable*.[41] This incommensurability seems to suggest that

[40] Schulze and Kneese (n 38).

[41] The term 'incommensurability' comes from two very different but equally important bodies of philosophical literature. It may refer to incommensurability of *values*, developed by Isaiah Berlin in the context of value pluralism for political philosophy (George Crowder, 'Pluralism and Liberalism' (1994) 42 Political Studies 293.) It may also refer to incommensurability of *scientific epistemologies*, used by

mobilising both views of risk simultaneously might be problematic, and it is crucial to identify which 'view' is adopted in a risk regulatory regime.

Therefore, the core research question of this thesis is to clarify how a particular view of risk is adopted and becomes 'institutionalised' through the process of risk communication. However, it should be noted here that although I have discussed the 'mobilisation' of both views of risk in regulation, my major concern here is *not* about studying the 'hybrid case' of how the two different views co-exist and interact in a risk regulatory regime. Nor am I trying to reconcile the incommensurability of the two views or to propose a grand unified 'risk theory'. The objective of this thesis is rather modest: to demonstrate how the social and the economic views of risk operate in two different case studies. While research has shown the complexity and ambiguity of 'risk regulatory concepts',[42] less work has been done to investigate the impacts of these different 'concepts' on practices of risk regulation, and risk communication in particular. It is therefore essential to simply unpack these two 'views' of risk.

The institutionalisation of different features of the social/economic view of risk is hence the key theme of my research. As Fisher has pointed out, the central issue of risk regulation is the institutional design of regulatory mechanism.[43] I would like to push this argument one step further, and argue that one fundamental dilemma of modern risk regulation is perhaps a basic conflict between two incommensurable views towards risks. The two divergent risk conceptions, as two different *institutions*,

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Thomas Kuhn to describe the curious shift of scientific paradigms in the field of philosophy of science (Thomas S Kuhn, *The Structure of Scientific Revolutions* (3rd edition, University of Chicago Press 1996).) Here I use the idea of incommensurability in both senses. On the one hand, the two divergent views of risk carry different 'values', and adopting a certain view requires 'hard choices' (Crowder 294–296.). On the other hand, the two views also represent different sets of scientific knowledge and epistemology. In this sense, taking a particular view of risk may lead to the development of a specific 'paradigm' of understanding risk.

[42] Fisher (n 4).

[43] Fisher (n 19).

are the foundations of the conceptualisation and communication of risk in regulatory practice. To unpack the construction of the social/economic view of risk, I will use a grounded institutional approach that empirically investigates the actual activities of risk communication among various experts.

2. Empirical Context: Inter-Expert Risk Communication

This section introduces the empirical focus and context of this thesis — 'inter-expert risk communication', defined as exchanges of information related to risk among experts. I will first explain *why* it is crucial to focus on the 'inter-expert' aspect of risk communication. Then I will discuss *how* inter-expert risk communication can be analysed, through the lens of historical and sociological institutionalisms as well as the four analytical dimensions that I developed.

2.1 Why does inter-expert risk communication matter?

Expertise plays a very crucial role in regulatory practice, especially in areas related to science, technology and risk. As introduced above, expertise is the first and perhaps most fundamental feature distinguishing the social and the economic views of risk. The construction of the two views of risk is entangled with different epistemologies of risk adopted by experts. It follows logically that, in order to further clarify the two divergent risk conceptions, the views of experts are key.

Focusing empirically on 'expert views', however, should not be misinterpreted as a normative statement that prioritises 'science' over 'democracy'. It is not the main

objective of my research to join the debate about science/democracy dichotomy.[44] In fact, I would like to argue that it is essential to examine the epistemological basis of risk regulatory practice before advancing any normative claim. Experts, in this sense, are those who contribute to the adoption of certain epistemologies of risk in the practice of risk regulation. My definition of 'expert' is therefore a broader one: it includes not only 'technical experts' like scientists, economists and other academics, but also 'specialised policymakers', who have a certain degree of specific expertise and communicate actively with technical experts, such as public servants working in specialised national/EU bodies or agencies.

These 'expert views' will then be analysed by looking at empirical data of *risk communication*. In the risk regulation literature, risk communication is often defined as 'an interactive process of exchange of information and opinion among individuals, groups and institutions' that contains messages related directly or indirectly to risks.[45] Risk communication is thus a process that connects different actors, including scientists, regulators and the public, for the purpose of identifying, analysing and regulating risks.

In various academic models formulated by different studies about risk regulation, the role of risk communication is often a central one.[46] Risk communication has developed into an academic field in its own right, influenced firstly by experimental psychology and later on by sociology and cultural studies. However, studies tend to

[44] The focus is an empirical choice (ibid 18). Fisher also noted how her argument about the problematic science/democracy dichotomy was often misinterpreted in the debate as supporting either side of the camps. Similarly, my focus on 'experts' should not be understood as a normative claim that argues 'science/expertise' as more important than 'democracy'.

[45] National Research Council, *Improving Risk Communication* (National Academies Press 1989) 21.

[46] For example: Ortwin Renn, *Risk Governance: Coping with Uncertainty in a Complex World* (Earthscan 2008); Alemanno (n 19); OECD, *Risk and Regulatory Policy: Improving the Governance of Risk* (OECD Publishing 2010).

confine the field of risk communication to the relationships between the government and the public, or those between regulators and regulated; they also tend to be 'policy-oriented', concentrating on formulating guidelines or policy suggestions for the authorities to better communicate sciences and risk policies to the lay public.[47] A significant strand of risk communication research is thus dominated by studies related to what I called *expert-lay* risk communication in a narrower sense, providing various strategies about how regulators can best 'educate/persuade' people, understand 'lay perceptions' and build 'trust' among the general public.[48]

The 'inter-expert' aspect of risk communication is therefore less studied in contemporary risk communication literature. There is already research noting that the 'internal' interactions between scientists and regulators are often neglected;[49] or as Hood, Rothstein and Baldwin have emphasised, the role of the 'inner life' of risk bureaucracies in risk regulation is crucial but often overlooked.[50] Being the core of risk regulation, risk communication should be studied in a broader sense, as 'a constructive dialogue between all those involved in a particular debate about risk'.[51] Looking at risk communication can shed light on not only the discussion and evaluation of risks in policymaking, but also the formation of different professional views towards risks. For the purpose of this thesis, 'risk communication' should not be limited to the strategies used for 'communicating' with, or even 'educating', the

[47] For example: Renn (n 45) 242; Paul Slovic, 'Perceived Risk, Trust, and Democracy' (1993) 13 Risk Analysis 675; W Leiss, 'Three Phases in the Evolution of Risk Communication Practice' [1996] The Annals of the American Academy of Political and Social Science 85; B Fischhoff, 'Risk Perception and Communication Unplugged: Twenty Years of Process' (1995) 15 Risk Analysis 137; Ragnar EE Lofstedt, *Risk Management in Post-Trust Societies* (Earthscan 2012).

[48] Ragnar E Lofstedt, 'How Can We Make Food Risk Communication Better: Where Are We and Where Are We Going?' (2006) 9 Journal of Risk Research 869.

[49] Renn (n 45) 202.

[50] Hood, Rothstein and Baldwin (n 18) 143 and 185.

[51] Lofstedt (n 47) 871.

lay public; rather, it should be understood as interactions between different actors, especially experts, that discuss about and make sense of risk in a risk regulatory regime. *Inter-expert risk communication* is therefore my unit of analysis to illustrate how different views of risk are entrenched and developed into two paradigmatic risk conceptions. In other words, analysing risk communication activities among experts can explain how the social and the economic views of risk come about.

Finally, the empirical focus of my research can be further narrowed down to the creation of two *risk regulation standards* as case studies. In a risk regulatory regime, the standard-setting process is where the evaluation of risk and the determination of the acceptability of risk take place. Standard-setting provides an institutional context for risk evaluation, which is the key to fully understand risk regulation.[52] In this thesis, my analysis will focus on inter-expert risk communication in relation to two processes of standard-setting, one on climate change mitigation (the climate case) and the other on the macroeconomic stability of the Eurozone (the euro case). But before further introducing the two case studies in Section 3, I shall first explain how I plan to analyse inter-expert risk communication.

2.2 How to analyse inter-expert risk communication?

Risk communication activities will be analysed through a lens of institutionalism, in order to demonstrate how a certain view of risk can be enhanced and eventually be 'institutionalised' as a paradigmatic risk conception that guides the practice of risk regulation. More specifically, my analytical lens blends historical and sociological

[52] Fisher (n 19) 3–6; Robert Baldwin, Martin Cave and Martin Lodge, *Understanding Regulation: Theory, Strategy, and Practice* (2nd edn, OUP 2012) ch 14.

institutionalisms,[53] by looking at the actual processes of risk communication among experts as temporal sequences, and key features of the two divergent risk conceptions as social constructions.

Institutional studies in the field of risk regulation often examine the effects of different patterns of 'administrative constitutionalism' or 'regulatory regimes' on risk regulatory practices.[54] My institutional approach focuses on a more abstract level of institutions, i.e. 'risk conceptions'. The core argument of this thesis is that the process of inter-expert risk communication can give rise to a particular risk conception. My analysis is 'historical', because not only do I look at historical data, but I also concentrate on the *path dependent* nature of risk communication that strengthened the existing views of risk.[55] This research is also 'sociological', because it discusses how risk conceptions are *socially constructed*, when various cognitive scripts are adopted and enhanced during the process of inter-expert risk communication.[56] In short, path dependence of risk communication and the social construction of risk conceptions are the main analytical themes that explain the divergence between the social view and the economic view of risk in the two case studies.

The argument of path dependence and the entrenching of pre-existing social/ economic views of risk may seem tautological, but the purpose of my thesis is not to set up a straw man. On the contrary, the thesis aims to characterise the crucial yet often neglected nuances of risk conception in regulatory practice. In addition, I should

[53] As introduced in n 6, there are three schools of new institutionalism: rational choice, historical and sociological institutionalisms.

[54] Fisher (n 19); Hood, Rothstein and Baldwin (n 18).

[55] Historical institutionalism focuses on the concept of path dependence, in order to explain how pre-existing institutions reinforce the development of particular institutions over time: Paul Pierson, *Politics in Time: History, Institutions, and Social Analysis* (Princeton University Press 2004).

[56] Sociological institutionalism focuses on the role of institutions as cultural or behavioural templates that are socially constructed: Walter W Powell and Paul J DiMaggio (eds), *The New Institutionalism in Organizational Analysis* (University of Chicago Press 1991).

also stress that processes of 'risk communication' and 'risk conceptualisation' are always interdependent. My institutionalist approach therefore seeks to unpack the mutually constitutive interactions between inter-expert risk communication and risk conceptions.

Building on the mixture of both historical and sociological institutionalisms, I break down my analysis into four 'dimensions' of inter-expert risk communication — networks, cultures, dynamics and strategies. It should be noted that these analytical dimensions are not 'real' dimensions that exist in the practice of risk communication. Rather, they are analytical constructs that allow me look at the process of inter-expert risk communication from different perspectives. To briefly introduce these analytical dimensions here, *networks* focus on the relations and interactions between different actors involved in risk communication; *cultures* refer to values and mentalities shared among actors in the process of risk communication; *dynamics* represent changes and shifts in risk-related messages during risk communication; and *strategies* refer to arguments and methods used for setting risk regulation standards. The four analytical dimensions are interconnected, and as I will demonstrate throughout this thesis, each contributes to different features of the two divergent risk conceptions.

To summarise, this thesis analyses inter-expert risk communication through an institutionalist lens with four interlinked analytical dimensions. Chapter 2 will provide more detailed literature review about risk communication, historical and sociological institutionalisms, as well as studies supporting my framework consisting of the four analytical dimensions. For the purpose of this introductory chapter, I will now turn to my research design and explain how my case studies can answer my research question about the two divergent risk conceptions.

3. Cast Studies: Climate Change v Eurozone Crisis

Having explained that analysing risk communication activities between different experts in the standard-setting process is a good way to trace, map and characterise the two risk conceptions, the issue now is to further narrow down my empirical focus to a reasonable and manageable scale. Since the main purpose of this thesis is to understand the significance of the two paradigmatic 'views' of risk in the contexts of risk regulation, I design my research following a two-case comparative method. Two sets of risk regulation standards that are associated with very different views toward risks are selected as my two case studies. These two cases, following roughly the Most Similar Systems Design,[57] should be able to demonstrate how the two divergent views of risks, through the process of risk communication, can eventually lead to the development of two risk conceptions. The key is to find two cases that are comparable yet rooted in different epistemologies of risk.

Based on these methodological principles, I selected one case about climate change (the *climate case*) and the other one about the Eurozone crisis (the *euro case*), representing the social and the economic view of risk, respectively. Predominantly social, in the climate case, the analysis will focus on the making of the 2-degree climate target, which was proposed by the EU in 1996 that global mean temperature should not rise above 2˚C comparing to the pre-industrial level; in the euro case, predominantly economic, the study will centre around the creation of the fiscal rules of the Eurozone, which were laid down in the 1992 Maastricht Treaty as excessive deficit criteria, requiring Member States to control their budget deficits and public

[57] Carsten Anckar, 'On the Applicability of the Most Similar Systems Design and the Most Different Systems Design in Comparative Research' (2008) 11 International Journal of Social Research Methodology 389.

debts under certain levels comparing to their GDP. The following two subsections will briefly introduce these two case studies, while the third subsection will discuss how this two-case comparison can help answer the original research question about the two divergent risk conceptions.

3.1 Climate case: the 2-degree target

The risk of climate change was characterised legally as 'dangerous anthropogenic interference with the climate system' in Article 2 of the United Nations Framework Convention on Climate Change (UNFCCC)[58]. However, the precise acceptability of climate risk, i.e. to what degree is climate change considered 'dangerous', was left undefined. Against this background, in June 1996, the Environment Council of the EU adopted the famous *2-degree target*, in order to provide a risk regulatory standard for climate policies:

> [The] Council believes that global average temperatures should not exceed 2 degrees above pre-industrial level and that therefore concentration levels lower than 550 ppm CO2 should guide global limitation and reduction efforts.[59]

The 2-degree target as an EU position toward climate risk was promoted in the international climate negotiation and, after more than 10 years, was finally adopted at the global level in the 2009 Copenhagen Accord.[60] The international community and academia are now even discussing 1.5˚C as the new target.[61] The 2-degree target has

[58] United Nations Framework Convention on Climate Change (adopted 9 May 1992, entered into force 21 March 1994) 1771 UNTS 107 (UNFCCC).

[59] Council of the European Union, 'Community Strategy on Climate Change – Council Conclusions', 1939th Council Meeting (Brussels, 25-26 June 1996) para 6.

[60] UNFCCC, 'Copenhagen Accord of 18 December 2009', Decision 2/CP.15 (FCCC/CP/2009/11/Add.1, 30 March 2010) section 1.

[61] ibid section 12; Michiel Schaeffer and others, 'Long-Term Sea-Level Rise Implied by 1.5 °C and 2 °C Warming Levels' (2012) 2 Nature Climate Change 867.

clearly become a standard that guides climate policy debates.

There are several reasons for the making of the 2-degree target to be considered as a suitable case to analyse the social view of risk. First of all, climate scientists and policymakers were evaluating the risk of climate change as something dangrous to be regulated, a potential threat to all humanity. Hence mitigating climate change is the objective of risk regulation, and the impacts of climate change are collective and public. A generally negative view of risk is adopted here in the case of climate change. Secondly, the evaluation of climate risk in general and the 2-degree target in particular have relied heavily on the natural sciences. Yet according to many historical studies about the 2-degree target, the precise scientific origin of this target was actually unclear.[62] This suggests that risk communication activities related to the 2-degree target were complex and not as straightforward as the target seemed to be. Thirdly, following the previous point, it is also interesting to investigate why global mean temperature was chosen as the key indicator of climate risks, rather than other potential indicators such as change of sea level, melting of polar ice caps or concentration of greenhouse gases. Some critics argued that the 2-degree target was not a good target in terms of science,[63] while others commented that 2˚C was a focal point and eventually a political decision.[64] This means the history of the 2-degree target was heavily entangled with climate change politics, and studying this case will cover communications between both scientists and policy- makers in terms of risk

[62] Carlo C Jaeger and Julia Jaeger, 'Three Views of Two Degrees' (European Climate Forum 2010) ECF Working Paper 2; Samuel Randalls, 'History of the 2˚C Climate Target' (2010) 1 WIREs Climate Change 598; Beatrice Cointe, PA Ravon and E Guérin, *2˚C: The History of a Policy-Science Nexus* (IDDRI Working Papers 2011).

[63] David G Victor and Charles F Kennel, 'Ditch the 2 °C Warming Goal' (2014) 514 Nature 30; Mitsutsune Yamaguchi, 'The Ultimate Objective of Climate Response Strategies, and a Desirable and Feasible International Framework' in Mitsutsune Yamaguchi (ed), *Climate Change Mitigation: A Balanced Approach to Climate Change* (Springer 2012) 7.

[64] Jaeger and Jaeger (n 61); Hans Joachim Schellnhuber, 'Tragic Triumph' (2010) 100 Climatic Change 229.

communication among experts, widely defined.

Therefore, the case of the 2-degree target, the *climate case*, is a good example to provide insights to the process of inter-expert risk communication. Empirically the climate case will focus specifically on the creation of the 2-degree target at the EU level in the mid-1990s. Tracing back from the 1996 Council Conclusions, my analysis will cover major actors that contributed to the discussion and formation of the 2-degree target, including the expert groups of the Council, the delegation of the EU to the UNFCCC, the European scientists participated in the Intergovernmental Panel on Climate Change (IPCC), the DG XI (Environment) of the Commission, the European Environment Agency (EEA) and its precursor, the EEA Task Force, and experts in several national ministries of EU Member States. Official reports created by these institutions and other academic studies on the history of the climate change policy[65] have identified the above mentioned bodies as key actors involved in this rather complicated debate, which helped to further confine the scope of this case study.

3.2 Euro case: the fiscal rules

The outbreak of the sovereign debt crisis in Greece in late 2009, later on escalated into the Eurozone crisis, has triggered highly scrutinised reviews of budgetary disciplines in the EU.[66] The often-criticised excessive deficit criteria, labelled as the

[65] EU Climate Change Expert Group, 'The 2°C Target: Background on Impacts, Emission Pathways, Mitigation Options and Costs' (2008); Katherine Richardson, Will Steffen and Diana Liverman, *Climate Change: Global Risks, Challenges and Decisions* (CUP 2011); Hartmut Grassel and Bert Metz, 'Climate Change: Science and the Precautionary Principle' in EEA (ed), *Late Lessons from Early Warnings: Science, Precaution, Innovation* (EEA 2013).

[66] David Marsh, *Europe's Deadlock: How the Euro Crisis Could Be Solved - and Why It Won't Happen* (Yale University Press 2013); Kazimierz Laski and Leon Podkaminer, 'The Basic Paradigms of EU Economic Policy-Making Need to Be Changed' (2012) 36 Cambridge Journal of Economics 253; Kevin Featherstone, 'The Greek Sovereign Debt Crisis and EMU: A Failing State in a Skewed Regime'

fiscal rules of the European Economic and Monetary Union (EMU) in this thesis, are standards that trigger the Excessive Deficit Procedure (EDP) laid down in the 1992 Maastricht Treaty and reaffirmed by the Stability and Growth Pact (SGP) and the European Council in 1997.[67] According to the Treaty text and its protocol, 'Member States shall avoid excessive government deficits' by following two criteria to maintain the ratio of government deficit to GDP under 3% and the ratio of government debt to GDP under 60%.[68] These two criteria (3% deficit, 60% debt) of the fiscal rules have become the benchmark for Eurozone countries to assess their budget deficits, and the cardinal standards for the EU to manage the risk of macroeconomic instability in the Eurozone.

Reasons for the fiscal rules to be an appropriate case to illustrate the economic view of risk are the following. Firstly, risks of economic instability were deemed as some 'spillover' effects associated with the creation of the EMU — they were by-products of the EMU, not some pre-existing hazards to be regulated. In this sense, managing 'risks' was an integrated part of the EMU project and each Member State decided to agree and join the EMU based on its independent sovereignty. The fiscal rules were hence tools of risk management, and Member States choose to accept and obey this particular arrangement of macroeconomic risk on individual and separable bases, which reflects an economic view towards risks. Second, economics was undoubtedly the major source of expertise in the EMU debate. The analysis of the

(2011) 49 Journal of Common Market Studies 193; Ludger Schuknecht and others, 'The Stability and Growth Pact: Crisis and Reform' (ECB 2011) Occasional Papers 129; Matthew Lynn, *Bust: Greece, the Euro and the Sovereign Debt Crisis* (1 edition, Bloomberg Press 2010).

[67] European Council, 'Resolutions of the European Council on the Stability and Growth Pact', Amsterdam, 16-17 June 1997.

[68] Consolidated version of the Treaty on the Functioning of the European Union [2012] OJ C326/47 (TFEU) art 126 (ex TEC art 104) and Protocol (No 12) on the Excessive Deficit Procedure.

EMU project and the design of the fiscal rules relied mainly on the method of CBA.[69] The whole process of risk communication was heavily influenced by economists and experts in public finance. Finally, although the EMU debate was based on economic expertise, the scientific argument for the fiscal rules was rather simple.[70] This was already criticised by many academics in the 1990s, before the current Eurozone crisis.[71] In fact, most studies agree that the EMU was after all a political project.[72] The 'non-economic' nature of monetary integration suggests that the fiscal rules have played a crucial role in shaping the complex debate between the economic expertise and politics.

Studying the *euro case*, i.e. the construction of the EMU fiscal rules, can provide a sophisticated picture of the economic view towards risk. Inextricably linked with the negotiation of the EMU, the analysis of the euro case will concentrate on risk communication activities related to the fiscal rules that took place mainly from the 1989 Delors Report[73] and the 1992 Maastricht Treaty. Major actors that contributed

[69] Commission, 'One market, one money: An evaluation of the potential benefits and costs of forming an economic and monetary union', European Economy No 44, Brussels, October 1990; Committee for the Study of Economic and Monetary Union (ed), *Collections of papers submitted to the Committee for the Study of Economic and Monetary Union* (European Communities 1989).

[70] 60% public debt was the average figure of the European Community in 1990. In order to at least maintain such debt ratio, under the condition of 2% inflation rate and the assumption of 3% annual growth in GDP, the tolerable deficit is then 3% of GDP. Jan Viebig, *Der Vertrag von Maastricht: Die Positionen Deutschlands Und Frankreichs Zur Europäischen Wirtschafts- Und Währungsunion* (Schäffer-Poeschel 1999) 355–364; Daniel Gros and Niels Thygesen, *European Monetary Integration: From the European Monetary System to Economic and Monetary Union* (2nd edn, Longman 1998) 340.

[71] Jose Vinals, 'Building a Monetary Union in Europe: Is It Worthwhile, Where Do We Stand, and Where Are We Going?' (Centre for Economic Policy Research 1994) CEPR Occasional Paper No. 15; Barry J Eichengreen, *Should the Maastricht Treaty Be Saved?* (Princeton Univ Intl Economics 1992); David Begg and others, *The Making of Monetary Union: Monitoring European Integration* (CEPR 1991).

[72] Two books written by former central bankers who participated in the EMU project are particular insightful: Andre Szasz, *The Road to European Monetary Union* (Palgrave Macmillan 1999); Tommaso Padoa-Schioppa, *The Road to Monetary Union in Europe: The Emperor, the Kings, and the Genies* (2nd Revised edition, OUP Oxford 2000); for a much more radical critique from a former Eurocrat: Bernard Connolly, *The Rotten Heart of Europe* (Faber & Faber 2013).

[73] Committee for the Study of Economic and Monetary Union, 'Report on economic and monetary

to the debate were the Monetary Committee (MC, replaced by the Economic and Finance Committee after 1999), the DG II (Economic and Financial Affairs) of the Commission, the Ecofin Council, the Intergovernmental Conference (IGC) on the monetary union, the Committee of Governors of Central Banks (CoG, the precursor of the European Central Bank) and several academics as external experts. A rich literature on the history and political economy of the EMU[74] has defined a relatively clear boundary for this euro case and provided contexts and background for my empirical analysis.

3.3 Two case studies for the two divergent risk conceptions

The objective of comparing these two cases is to understand how different views of risk among experts can influence the practice of risk communication, in order to further characterise the two risk paradigms. The assumption is that actors in the euro case have utilised an economic view of risk, whereas those in the climate case have adopted a more social view of risk.

In fact, various aspects of the two cases can be attributed to the four major differences between the two divergent views of risk (Table 1). First, *evaluation of risk was based on different fields of expertise*: the discussion of the fiscal rules was grounded primarily in economic analysis and CBA, while the debate of the 2-degree target was focusing on scientific impact assessment. Second, *risk was identified differently in relation to regulation*: the risk of economic instability was considered as a potential side-effect and an integrated part of the EMU project, while climate risk

union in the European Community' (Delors Report, European Communities 1989).

[74] On top of the sources listed in footnote 72, see also Harold James, *Making the European Monetary Union* (Belknap Press 2012); David Marsh, *The Euro: The Battle for the New Global Currency* (Yale University Press 2011); Kenneth Dyson and Kevin Featherstone, *The Road to Maastricht: Negotiating Economic and Monetary Union* (Oxford University Press 1999).

was defined as something special or abnormal to be regulated by common EU climate policies. Third, *the probability of risk was conceptualised differently*: in the euro case, macro- economic instability was considered by experts as predictable and measurable, while in the climate case, the issue of scientific certainty in climate sciences was constantly contested. Fourth, *the consequences of risk were framed differently*: in the euro case, the EMU project was considered an opportunity for deeper European integration, while in the climate case, the issue of climate change was conceived as a collective danger to humankind.

With these different aspects of expert views towards risks, analysing activities of risk communication in the two case studies can help clarify the two paradigmatic risk conceptions in contexts of risk regulation. To further justify my case selection, other contextual factors of these two cases are held relatively similar so that a focused comparison is possible. The two cases both happened in the 1990s, with similar historical background of post-Cold War globalisation and European integration. Furthermore, both risk regulatory standards were decided at the EU level. Although they involved different legislative procedures, the major debate of both cases took place in expert bodies that provided opinions for the Council.[75] In addition, the two risk regulatory standards followed a similar design, using hard numerical ceilings while remaining soft in their interpretation and enforcement. In Chapter 3, I will discuss the history of the two risk regulatory standards and the contexts of the two cases in detail. To provide a full overview of my DPhil thesis in this first chapter, I

[75] There were two ad hoc groups of climate change experts under the structure of the Environment Council, although this institutional structure was seldom mentioned in the literature, see for example Sebastian Oberthur and Marc Pallemaerts (eds), *The New Climate Policies of the European Union: Internal Legislation and Climate Diplomacy* (VUB Press 2010). For the euro case, the Monetary Committee and its Alternates were at the core of the decision-making process, and these bodies were discussed in detail in several studies, for example Age FP Bakker, *The Liberalization of Capital Movements in Europe: The Monetary Committee and Financial Integration, 1958-1994* (1st edn, Springer 1995).

will now introduce the overall structure of my thematic analysis.

4. Thesis Outline: A Thematic Socio-Legal Analysis

To conclude, this DPhil thesis seeks to explain the construction of two divergent risk conceptions in regulatory practice, by comparing inter-expert risk communication in relation to two cases of risk regulation standard-setting. I argue that the social and the economic views of risk are entrenched through the actual process of risk communication among experts in the climate case and the euro case, respectively.

The following two chapters lay out important background information about the field of risk communication and my two case studies. Chapter 2 will provide a thorough and critical review of the contemporary literature on risk and regulation. In particular, I will explain why risk communication, especially the inter-expert aspect thereof, is a valuable area to study risk regulation. Chapter 3 will offer a more detailed introduction to the two case studies, their historical contexts, and present them through the analytical framework of the four features of risk conceptions as well as the four dimensions of risk communication. In addition, this chapter and the Appendix will also discuss some technical issues regarding access to data and other practical issues related to my empirical analysis.

The subsequent four chapters, following the four analytical dimensions, form the core of this thesis. Chapter 4 is about *networks* of risk communication. Scientists and policymakers discussed the 2-degree climate target in an organisational form that I call open ‘bridge’, while experts who participated in the negotiation of the EMU fiscal rules formed a closed ‘club’. I argue that these two expert networks have shaped the practice of risk communication and eventually enhanced different epistemologies of

risk. Chapter 5 is about *cultures* of risk communication. Through narrowing down and conceptualising risks, experts in the two cases have framed risk through different approaches. It has generated two distinct cultures of persuasive risk communication: 'pessimism' in the climate case that focused on getting messages of climate change across and framed climate risks negatively; and 'optimism' in the euro case that concentrated on realising the EMU and thus framed potential risks to the euro project positively. Chapters 4 and 5 will analyse the general environments where risk communication activities take place, and show how they contribute to the adoption of various features of risk conceptions.

Chapter 6 is about *dynamics* of risk communication. During the setting of risk regulation standards, some messages about risk are strengthened and thus amplified risks, while other messages are weakened and risks attenuated. The climate case was dominated by 'amplification', which aggregated various negative concepts of climate risk into the notion of global mean temperature as a simple scientific climate indicator; the euro case, on the contrary, was dominated by 'attenuation', which transformed risks *of* the EMU into risks *to* the EMU and foregrounded the positive aspects of the euro project. Finally, Chapter 7 is about *strategies* of risk communication. The two sets of risk regulation standards, the 2-degree target and the fiscal rules, are often criticised as arbitrary. However, they are arbitrary in a strategic sense, and in the two case studies, experts used different arguments to justify their choices of risk regulation standards. Experts in the climate case emphasised the notion of 'precaution', framing 2˚C as a necessary threshold to avoid dangerous climate change; in contrast, experts in the euro case prioritised the idea of 'prediction', seeing the two criteria of 3%/60% GDP as good benchmarks for sound budgetary disciplines. Chapters 6 and 7 thus investigate the actual processes of risk communication, and demonstrate how these

processes reinforced different features of divergent risk conceptions.

The final chapter, Chapter 8, will conclude my findings with some discussions about further studies. Through analysing inter-expert risk communication empirically, my thesis explains how the social and the economic views of risk become entrenched paradigmatic views, as two divergent risk conceptions. This exercise not only shows that comparing very different fields of risk can generate rich results, but also suggests that my empirical context of inter-expert risk communication can be developed into a standardised method for analysing risk regulation. Future research about the two divergent risk conceptions should analyse how the social and the economic views of risk 'co-exist' in the same risk regulatory regime, as well as how they 'co-evolve' over time. Understanding the construction of the divergent risk conceptions is the first step towards overcoming incommensurability between the social view and the economic view of risk in regulatory practice. This shall begin with a critical review of current risk communication literature, which is the theme of my next chapter.

Chapter 2
Analysing Inter-Expert Risk Communication

> *Only at the risk of great peril can it be assumed that when experts disagree, the truth must be somewhere in between.*
>
> — *James Watson*[1]

It was February 1975. Experts gathered at the Asilomar State Beach were seeking to reach consensuses on potential risks and regulations of the new recombinant DNA technology. The conference marked the beginning of open debates about science policies. Decades later, we can still see scientists, economists, and policymakers disagreeing significantly, this time not only about the application of recombinant DNA techniques or biomedical issues, but also about problems with global reach, such as climate change and the financial crisis. At the frontier of human experience, the diversity of professional opinions is the norm.

Risk constantly puzzles experts. As introduced in the first chapter, there are competing paradigms in academic studies of risk (from realism to constructivism)[2] as well as in the practice of risk regulation (be it rational-instrumental or deliberative-constitutive).[3] While I am interested primarily in the latter issue, i.e. the 'views' of risk in real practice, it should be noted that scholarly paradigms can also influence regulatory practice through scientific advocacy. It is therefore crucial to examine how experts think and talk about risk in practice, by focusing empirically on what I called 'inter-expert risk communication'. This chapter will fully explain this context.

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[1] James D Watson, 'In Defense of DNA' (Cold Spring Harbor Laboratory Annual Report 1976, reprinted by University of Rochester Medical Center 1978) 13. This article is a response to the guideline adopted in the Asilomar Conference on recombinant DNA, which, in Waston's opinion, was a rather unsatisfactory outcome.

[2] Deborah Lupton, *Risk* (2nd edn, Routledge 2013); Eugene A Rosa, 'Metatheoretical Foundations for Post-Normal Risk' (1998) 1 Journal of Risk Research 15.

[3] Elizabeth Fisher, *Risk Regulation and Administrative Constitutionalism* (Hart Publishing 2007).

I will start with a more thorough introduction of the two divergent risk conceptions, the *social view* and the *economic view* of risk, as well as four key 'features' associated with these two different risk conceptions (Section 1). Then I will discuss the analytical importance of *inter-expert risk communication*, including the central role of risk communication in risk regulation, the lack of research about the 'inter-expert' aspect of risk communication, and the relevance of risk regulation standards for the research design (Section 2). Inter-expert risk communication, as the empirical field of this thesis, will be studied through the lens of institutionalism. To be specific, I will combine both *historical institutionalism*, which concentrates on path dependence of risk communication activities, and *sociological institutionalism*, which focuses on the social construction of risk conceptions through risk communication (Section 3). Finally, I will explain the four analytical dimensions of inter-expert risk communication that arose from my empirical analysis of the two case studies. These four analytical dimensions are *networks*, *cultures*, *dynamics* and *strategies* of risk communication (Section 4).

1. Four Features: Characterising Social and Economic Views of Risk

The central argument of this thesis is that there are two divergent risk conceptions, one 'economic' and the other 'social', that dominate experts' understanding of risk in regulatory standard-setting. I seek to demonstrate how the social and the economic views of risk are constructed through inter-expert risk communication, by analysing the actual activities of risk communication among experts in relation to two processes of setting risk regulation standards in the EU. Before discussing my analytical context of inter-expert risk communication, however, it is important to first of all clarify what

I really mean by the two different 'views' of risk.

Through my empirical analysis, I identify four specific 'features' that can characterise the differences between the social and the economic views of risk. These four features, to be introduced in detail in this section, are:

- *Expertise*: the scientific methods used for the evaluation of risk. What fields of expertise are involved in analysing risk? Do experts include a broader range of scientific approaches to assess risk? Or do they focus more exclusively on risk management through economic analysis?
- *Normality*: the status of 'risk' vis-à-vis normal regulatory practice. How is risk characterised in relation to the process of risk regulation? Is risk considered as something 'abnormal' or 'special' that requires extra regulatory attentions? Or is risk part of 'normal' or 'routine' of regulatory processes?
- *Probability*: the possibility of a risk event materialising. How do experts make sense of the uncertainty of risk? Is risk understood as inherently complex and 'uncertain'? Or is risk considered to be 'calculable' and thus manageable?
- *Impact*: the consequences of a risk event materialising. How do experts frame the outcomes of risk? Do experts concentrate only on the downside of risk? Or do they include also the upside and opportunities in their decisions?

1.1 Expertise: a mixed approach or prioritising economic analysis?

The feature of 'expertise' looks at the scientific approaches mobilised for the purpose of risk evaluation. It is perhaps the most fundamental feature that distinguishes the two different views of risk, as it reflects different epistemologies adopted by experts to understand risk. The key difference, I argue, lies in the *centrality of economics* in risk analysis: the social view of risk uses a wide range of scientific methods, including

economics, to analyse risk, whereas the economic view of risk, as the name suggest, focuses more exclusively on economic analysis.

Both 'risk' and 'economics' provide strong narratives for regulation, but there is a certain degree of fluidity in these two concepts.[4] Moreover, as discussed in the first chapter, risk was originally very much an economic idea.[5] It seems self-evident that those talking about risk in economic terms will prioritise economics in risk analysis. One can of course talk of risk management as insurance, hedging or diversification, but the modern concept of risk has evolved significantly, and in certain contexts, 'risk' is used as a synonym of danger or hazard, not so much about economic rationality.[6] This different reading of risk by the 'risk management' and the 'risk regulation' literature is often neglected. Yet it is crucial to clarify the difference in epistemologies of risk, because economics is indeed an essential part of risk regulation, and as Julia Black suggests, it is simply not accurate to think of risk as a concept that displaces economic rationales.[7]

The key difference between the two views of risk is therefore whether experts emphasise the use of economic approaches. When economics is highlighted as *the* method of risk analysis, it often treats risk as a technical issue that can be appraised quantitatively, hence linking with the other three features of risk conceptions that I will discuss below. The emphasis of economic thinking is not only predominant in the

[4] Julia Black, 'The Role of Risk in Regulatory Processes' in Robert Baldwin, Martin Cave and Martin Lodge (eds), *The Oxford Handbook of Regulation* (OUP 2010) 305.

[5] Peter L Bernstein, *Against the Gods: The Remarkable Story of Risk* (New Ed, John Wiley & Sons 1998).

[6] Lupton (n 2) 9–16; Mary Douglas, *Risk and Blame : Essays in Cultural Theory* (Routledge 1992); Mary Douglas and Aaron Wildavsky, *Risk and Culture: An Essay on the Selection of Technological and Environmental Dangers* (University of California Press 1983).

[7] Black (n 4) 306–307.

literature of business and finance,[8] but is also strongly associated with a *realist* tradition that believes risk is objectively measurable and can be reduced to pure mathematic (and oftentimes monetary) evaluation.[9] In other words, in an economic view of risk, the language of risk tends to be translated back to economic terms, and scholars talk of risk management based on economic rationality as 'decision science'.[10] Rather than confining it to the context of private business (the original birthplace of 'risk' as an economic concept), the economic view of risk is in fact widely promoted in regulation and public policy, most notably through the notion of a 'cost-benefit state'.[11]

A social view of risk, on the contrary, does not stress the superiority of economic rationality. This view is most evident in the scholarship of 'risk regulation' and policy areas related to new technologies and the environment, where 'risk' means a unique threat that requires regulatory control. Economics is still important, but so are many other scientific methods mobilised in risk assessment, depending on the nature of the issue. Moreover, while the social view of risk uses a wide range of scientific methods, it also emphasises the limits of science. Studies of risk regulation thus tend to focus on the contested science/democracy dichotomy, which reflects a polarisation between the techno-scientific and the socio-politic ways of risk evaluation.[12] By including a

[8] Aswath Damodaran, *Strategic Risk Taking: A Framework for Risk Management* (Wharton School Pub 2008); Vincent T Covello and Jeryl Mumpower, 'Risk Analysis and Risk Management: An Historical Perspective' (1985) 5 Risk Analysis 103.

[9] This is characterised as 'naïve realism' by Lupton (n 2) 49. Others argue that 'ontological realism' is necessary (Rosa (n 2) 24–27) and propose risk analysis based on economics and the 'rational actor paradigm': Carlo C Jaeger and others, *Risk, Uncertainty and Rational Action* (Routledge 2001).

[10] Jaeger and others (n 9) 73f; Ortwin Renn and Andreas Klinke, 'Systemic Risks: A New Challenge for Risk Management' (2004) 5 EMBO reports S41; Ortwin Renn, *Risk Governance: Coping with Uncertainty in a Complex World* (Earthscan 2008).

[11] Cass R Sunstein, *The Cost-Benefit State: The Future of Regulatory Protection* (American Bar Association 2002).

[12] Fisher (n 3) 16–18; John Adams, *Risk* (UCL Press 1995); The Royal Society, *Risk: Analysis, Perception and Management - Report of a Royal Society Study Group* (The Royal Society 1992) ch 1.

much broader range of approaches into risk analysis, the social view of risk presents a more complex and pluralist notion of risk than an economic-centred reading of risk. Scholars who hold a social view of risk therefore usually associate closely with a *constructivist* tradition of risk studies,[13] and talk about the knowledge of risk as socially constructed and 'co-produced' by different actors involved in the regulatory process.[14]

In short, the key difference in relation to 'expertise' is the centrality of economic reasoning (or the lack of it) in risk assessment. The two scholarly traditions of constructivism and realism have influenced how experts actually analyse risk in regulatory practice: some evaluate risk through a complex process that involves various fields of expertise (a social view), while others highlight the importance of economic rationality in their analysis (an economic view). The two views of course normally co-exist in practice, but often one will be dominant over the other, and further influence how experts think about the nature of risk vis-à-vis the whole regulatory standard-setting process.

1.2 Normality: risk as something 'special' or 'routine'?

'Normality', as my second key feature of risk conception, means whether risk is considered either 'normal' or 'abnormal' in relation to the practice of risk regulation. To elaborate, in a social view of risk, a risk is often seen as abnormal, as something special and as a potential threat that requires specific regulatory controls; in an economic view of risk, on the other hand, risk is usually considered as something

[13] Lupton (n 2) 41f; Rosa (n 2) 21–24; Renn (n 10) 2–4.

[14] Sheila Jasanoff, *The Fifth Branch: Science Advisers as Policymakers* (Harvard University Press 1998); Sheila Jasanoff, 'Ordering Knowledge, Ordering Society' in Sheila Jasanoff (ed), *States of Knowledge: The co-production of science and the social order* (Routledge 2004).

normal and part of private business or public administration that should be managed in a routine way. In other words, although risk is subject to regulation in both views, risk is treated with special attentions and lies at the heart of risk regulation in the social view, whereas in the economic view, risk is regarded as routine 'side-effects' for risk management.

The difference between *special* and *routine* is crucial for understanding the feature of normality. The nature of risk has a bearing on whether a risk is deemed 'normal' or 'abnormal'. Again, risks associated with new technologies and the environment, such as genetically modified organism (GMO), nanotechnology and climate change, are often considered as emerging threats that justify special regulation; other 'low-tech' risks like smoking or driving, while being indeed 'regulated', rarely attract intensive public or even scholarly attentions.[15] However, this distinction between special and routine risks is obviously contested. Studies of public risk perceptions suggest that 'dread', 'catastrophic', 'unfamiliar' and 'involuntary' risks are frequently perceived as more 'dangerous'.[16] But for my analysis in this thesis, the findings of psychology studies are less helpful, as experts and policymakers tend to have diverse views about the normality of risk. The issue of GMO is a classic example. In the US, regulation of GMO is based on the principle of 'substantial equivalence', which means if there is no significant differences between the components of a novel food product and those of existing food, then there is no

[15] There are of course studies looking at 'low-tech' risks such as issues of road safety, for example in Adams (n 12), or lifestyle risk such as Alberto Alemanno and Amandine Garde (eds), *Regulating Lifestyle Risks: The EU, Alcohol, Tobacco and Unhealthy Diets* (1 edition, Cambridge University Press 2015). However, these studies also tend to adopt a relatively 'realist' view of risk and stress the role of economic rationality in risk regulation.

[16] Paul Slovic, 'Perception of Risk' (1987) 236 Science 280; Paul Slovic, 'Perceived Risk, Trust, and Democracy' (1993) 13 Risk Analysis 675; Paul Slovic (ed), *The Perception of Risk* (Earthscan 2000).

requirement to regulate the novel food differently.[17] In Europe, GMO regulation is guided by the precautionary principle, which considers GMOs by definition special and uncertain due to the nature of its techniques, and thus requires higher scrutiny and specialised regulations.[18] Both jurisdictions claim that their risk assessments are 'scientific', while the core of dispute is actually about the 'normality' of GMO.[19] In this case, the normality of risk is not explained by factors such as dread or familiarity, but perhaps is more closely associated with transatlantic 'cultural' differences.[20]

To further clarify the notion of 'normality', I should also discuss two types of risk distinguished by Julia Black, called 'societal risk' and 'institutional risk'.[21] Black defines societal risks as 'risk to health, safety and the environment', and institutional risks as 'risks to successful delivery of programmes'.[22] Societal risk is therefore a

[17] OECD, 'Safety Evaluation of Foods Derived by Modern Biotechnology: Concepts and Principles' (OECD 1993); Henry I Miller, 'Substantial Equivalence: Its Uses and Abuses' (1999) 17 Nature Biotechnology 1042; Erik Millstone, Eric Brunner and Sue Mayer, 'Beyond "substantial Equivalence"' (1999) 401 Nature 525.

[18] John S Applegate, 'The Prometheus Principle: Using the Precautionary Principle to Harmonize the Regulation of Genetically Modified Organisms' (2001) 9 Indiana Journal of Global Legal Studies 207; Joyce Tait, 'More Faust than Frankenstein: The European Debate about the Precautionary Principle and Risk Regulation for Genetically Modified Crops' (2001) 4 Journal of Risk Research 175; Anne Ingeborg Myhr and Terje Traavik, 'The Precautionary Principle: Scientific Uncertainty and Omitted Research in the Context of GMO Use and Release' (2002) 15 Journal of Agricultural and Environmental Ethics 73.

[19] The different attitudes towards GMOs between the EU and the US led to the famous 'EC Biotech' case before the Dispute Settlement Body of the WTO. The EU implemented the 'general de facto moratorium' on GMO products after evaluating the scientific uncertainty of GMO; the WTO Appellate Body, however, decided that such moratorium constituted 'undue delay' of Sanitary and Phytosanitary (SPS) processes, and cannot be justified by the exception of insufficiency of scientific evidence (SPS Agreement art 5.7). In short, there is a nuance between 'scientific uncertainty' (the EU focus on the abnormality of GMO) and 'insufficiency of scientific evidence' (the US argument that supports normal risk assessment processes): European Communities – Measures Affecting the Approval and Marketing of Biotech Product (29 September 2006) WT/DS291/R, WT/DS292/R, WT/DS293/R. For a summary of the EC Biotech case: Debra Strauss, 'Feast or Famine: The Impact of the WTO Decision Favoring the U.S. Biotechnology Industry in the EU Ban of Genetically Modified Foods' (2008) 45 American Business Law Journal 775.

[20] A thorough comparing of the alleged 'transatlantic difference', however, concludes that neither the US or the EU is particularly 'precautious': Jonathan B Wiener and others, *The Reality of Precaution: Comparing Risk Regulation in the United States and Europe* (RFF Press 2010).

[21] Black (n 4) 324–325.

[22] ibid 325.

specific issue that requires regulatory attentions, a justification for and an object of regulation.[23] In this sense, the concept of 'societal risk' captures the feature of seeing risk as something 'special/abnormal' and hence the core objective of risk regulation. Institutional risk is rather different. It becomes 'an organising principle in private and public sector management thinking' and gives rise to the idea of 'new public risk management'.[24] A close relation with the notion of risk management in private firms suggests that managing institutional risks is about dealing with the internal operation of a regulatory organisation. The concept of institutional risk, in this sense, echoes an economic view that sees risk management as part of the 'routine/normal' activities of public administration.

There is, however, a subtle difference between seeing risk as 'normal' because it is considered 'not new' or 'not special' (as in the case of the US regulatory approach to GMO) and seeing it as 'part of internal operation' (as in the case of 'institutional risk'). I argue that an economic view of risk includes both notions of 'normality'. This partly explains what Black described as an 'imperceptible shift between societal and institutional risks'.[25] In fact, 'societal risks' can be viewed as 'normal' (either because of advances in technologies or subjective preferences) and be 'internalised' as part of routine of public administration. My case study about the negotiation of EMU fiscal rules demonstrates this process of transforming 'risk *of* the EMU' into 'risk *to* the EMU' (Chapter 5 and 6). Therefore, instead of talking about societal/institutional risks, it is equally important to examine the development of an economic view of risk, including its embedded feature of normality, in regulatory practice.

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[23] ibid 303–309; Sheldon Krimsky and Dominic Golding (eds), *Social Theories of Risk* (Praeger 1992).

[24] Black (n 4) 327–329; Michael Power, *Organized Uncertainty: Designing a World of Risk Management* (OUP 2007); Julia Black, 'The Emergence of Risk-Based Regulation and the New Public Management in the United Kingdom' (2005) 2005 Public Law 512.

[25] Black 339-340

The difference in attitudes towards the 'normality' of risk also exists in academic studies. In the literature of business and finance, risk is the norm and the foundation of capitalism.[26] Risk management, in this sense, means managing the 'side-effects' and is an integrated part of a business project.[27] In the scholarship of risk regulation, commentators advocating the superiority of economic rationality in regulation often criticise that the precautionary principle only looks at 'risk' as the target of regulation but neglects the fact that risk is actually ubiquitous;[28] supporters of the precautionary principle, however, argue that prioritising economic analysis will lose sight of some very special features of 'risk', such as risk being transnational, intergenerational and even interspecific.[29] In sociology, the 'risk society' thesis centres around the special characteristics of risk, but also regards 'risk' as the 'new normal' that guides the logic of society in reflexive modernity.[30]

Therefore, the (ab)normality of risk matters. Different academic concepts related to 'risk' complicated the identification of risk as special or routine in practice. Of course, it is difficult to demarcate the boundary between normal and abnormal, but it seems that the issue of normality is linked with the use of expertise: in the social view, risk is deemed abnormal and needs special regulatory attentions through a wide range of scientific methods; in the economic view, risk is normal or routine, and considered

[26] Nouriel Roubini and Stephen Mihm, *Crisis Economics: A Crash Course in the Future of Finance* (Penguin 2011).

[27] Edward Anderson, *Business Risk Management : Models and Analysis* (Wiley-Blackwell 2013); Damodaran (n 8); Covello and Mumpower (n 8).

[28] Sunstein argues that the precautionary principle works only when policymakers are 'waring blinders' and 'focusing on the "target" risk, [but] not on the systemic, risk-related effects of being precautionary': Cass R Sunstein, *Laws of Fear: Beyond the Precautionary Principle* (CUP 2005) 35 and 49.

[29] Douglas A Kysar, *Regulating from Nowhere: Environmental Law and the Search for Objectivity* (Yale University Press 2010).

[30] Ulrich Beck, *Risk Society: Towards a New Modernity* (Sage 1992); Anthony Giddens, *The Consequences of Modernity* (New Ed, Polity Press 1991). I will discuss the contribution of my findings to the sociological theories of risk in Chapter 8.

manageable by economic analysis. The feature of normality is nuanced but important, and it also contributes to the distinction between 'risk' and 'uncertainty', a point to be discussed in the next subsection.

1.3 Probability: risk considered as uncertain or calculable?

Compared to the above discussions, the last two features of risk conception are more straightforward, because they are originating from the common understanding of risk as 'probability times impact'.[31] The feature of probability is mostly about how experts deal with 'uncertainty'. To be more specific, it is about whether risk is considered as 'uncertain' or 'calculable': in a social view, risk is inherently uncertain, thus requires extra attentions; in an economic view, risk is often by definition calculable and hence manageable.

From the perspective of a social view of risk, experts tend to stress the complexity and uncertainty associated with risk analysis. This is a very common position in risk regulation, and it is contingent on other features of the social view of risk, such as that risk is abnormal and needs intensive scientific assessments. Furthermore, the uncertainty of risk is often entangled with 'scientific uncertainty'. In this sense, experts use various methods to assess risk, but they also emphasis the limits of scientific knowledge. This leads to a curious phenomenon of 'probability neglect' that is criticised by Sunstein:[32] while science can identify risk and make probabilistic estimations, the quantitative and/or statistic evaluation itself cannot be the sole justification of regulation, because risk is uncertain and a decision about risk

[31] Julia Black and Robert Baldwin, 'Really Responsive Risk-Based Regulation' (2010) 32 Law & Policy 181, 184 and 188; TM Williams, 'The Two-Dimensionality of Project Risk' (1996) 14 International Journal of Project Management 185; Covello and Mumpower (n 8).

[32] Sunstein (n 28) 39–41.

is 'value-laden'.[33] The notion of 'uncertainty' thus simultaneously empowers and constrains science. Examples of this risk conception in regulatory practice are numerous. Climate change, nanotechnology and GMO, all these debates focus on the uncertain nature of technologies and/or the complexity of environmental systems.

The economic view of risk, on the other hand, tends to make a clear distinction between 'risk' and 'uncertainty'. This distinction, prominent in the fields of business and finance, was first introduced in Frank Knight's seminal book in the 1920s.[34] He argues that 'Uncertainty must be taken in a sense radically distinct from the familiar notion of Risk', and defines risk, or 'risk proper', as quantifiable, and uncertainty as unmeasurable.[35] Knight's view is of course not uncontested, as many argue that his definition of 'uncertainty' is in fact a definition of 'ignorance', and uncertainty can still be measured through objective and subjective probabilities.[36] I do not attempt to unify all these different terms used in different fields, but the legacy of Knightian risk/uncertainty is clear: it presents a view that managing risk is about dealing with probability, and a *belief* that through probability, risk is calculable and measurable. This idea of risk as calculable is not only influential in finance, but also in many other policy areas related to risk management, such as health and safety.[37]

The feature of probability can therefore be summarised as different treatments of uncertainty. Risk is in fact always about uncertainty. For those adopting a social view

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[33] Bert Metz, *Controlling Climate Change* (CUP 2010) ch 3; Michael Oppenheimer, 'Defining Dangerous Anthropogenic Interference: The Role of Science, the Limits of Science: Dangerous Anthropogenic Interference' (2005) 25 Risk Analysis 1399.

[34] Frank H Knight, *Risk, Uncertainty and Profit* (Hart, Schaffiner & Marx 1921).

[35] ibid 19–20.

[36] Rosa (n 2); Christof Tannert, Horst-Dietrich Elvers and Burkhard Jandrig, 'The Ethics of Uncertainty. In the Light of Possible Dangers, Research Becomes a Moral Duty' (2007) 8 EMBO Reports 892; Jaeger and others (n 9) 78–79.

[37] Health and Safety Executive, 'Reducing risks, protecting people: HSE's decision-making process' (HSE 2001)

of risk, this 'uncertainty' makes risk special and emphasises that risk regulation is more than scientific evaluation of risk. However, for others with an economic view of risk, 'uncertainty' can be overcome by statistics and economic analysis. Being either uncertain or calculable, the understanding of probability eventually will also lead to different attitudes towards the consequences of risk.

1.4 Impact: risk as negative or positive?

The final and most defining feature distinguishing the two views of risk is about how people imagine the outcomes of risk. In the social view of risk, experts focus solely on negative consequences, whereas in the economic view of risk, they also include the positives and thus frame risk as opportunity. The impact of risk, therefore, can be viewed as either negative or positive.

This difference in negative/positive risk is almost self-explanatory. Focusing on environmental and technological risks, the scholarship of risk regulation often defines risk as 'social bads'.[38] Other scholars adopting a more rationalist perspective, on the other hand, tend to include both downsides and upsides of risk.[39] The scholarship of finance, however, sees risk as the essential element of profits (also a Kightian legacy), and frequently talk of 'risk premium' and 'risk-taking'.[40] In terms of practice, while most regulatory regimes define risk negatively, a more positive notion of risk is not a unique idea that exists exclusively in the contexts of private business and finance. As Black points out, some regulators, the Office of Fair Trading for example, actually

[38] Christopher Hood, Henry Rothstein and Robert Baldwin, *The Government of Risk: Understanding Risk Regulation Regimes* (Oxford University Press 2001); Veerle Heyvaert, 'Governing Climate Change: Towards a New Paradigm for Risk Regulation' (2011) 74 The Modern Law Review 817.

[39] Rosa (n 2); Jaeger and others (n 9); Renn (n 10).

[40] Knight (n 34); Damodaran (n 8).

define ‘risk’ positively as ‘the likelihood of a successful outcome’.[41] The concept of ‘sustainable development’ is also a good example of shifting the focus from avoiding environmental harms to promoting intergenerational equity and meeting both ‘present and future needs’.[42] From scholarly discussion to regulatory practice, ‘risk’ can bear both negative and positive connotations.

Emphasising negative or positive consequences of risk is in fact a key feature of risk conception that reflects the other three features discussed above. With the social view of risk, one sees risk not only as negative, but also as something highly uncertain, complex and ‘abnormal’ that requires assessment through a wide range of scientific expertise. With the economic view of risk, one sees risk differently in the sense of not only more positively, but also as part of a ‘normal’ routine that is manageable and calculable predominantly through economic methods or organisational management techniques. My main point here is that the four ‘features’ of risk conception are not independent from each other. They are two contrasting sets of interlinked characteristics that define the two divergent conceptions of risk adopted by experts, as illustrated in Table 2.1. These seemly sharp contrasts, however, should be understood in a more relative sense, bearing in mind that in reality experts’ ‘views’ of risk are often quite nuanced and context-dependent. Therefore, the focus of inter-expert risk communication, I argue, presents an apt empirical field to demonstrate how the social/economic view of risk can be entrenched through actual risk communication activities among experts.

[41] Black (n 4) 327; Office of Fair Trading, ‘OFT Prioritisation Principles’ (OFT 2008) 9.

[42] United Nations, ‘Report of the World Commission on Environment and Development: Our Common Future’ (UN 1987) A/42/427, ch 2.

Table 2.1: Four features of risk conceptions

	Social view of risk	**Economic view of risk**
Expertise	A wide range of expertise	Prioritising economics
Normality	Special, abnormal	Routine, normal
Probability	Uncertain	Calculable
Impact	Negative	Positive

2. Experts, Risk Communications and Risk Regulation Standards

The main goal of this thesis is to explain the construction of the aforementioned two views of risk by observing how experts think and talk about risk. To this end, I focus empirically on what I called 'inter-expert risk communication'. This section further clarifies why risk communication plays a central role in the process of risk regulation, why the 'inter-expert' perspective should be the main point of interest in analysing risk communication, and why I choose to concentrate on actual risk communication activities in relation to two particular processes of setting risk regulation standards in the EU. I shall begin with defining risk communication.

2.1 The central role of risk communication in risk regulation

The most commonly cited definition of risk communication in the literature of risk regulation is the one given by the National Research Council (NRC) of the US. The NRC states that risk communication is:

> an interactive process of exchange of information and opinion among individuals, groups and institutions. It involves multiple messages about the nature of risk and other messages, not strictly about risk, that express concerns, opinions, or reactions to risk messages or to legal and institutional arrangements for risk management.[43]

[43] National Research Council, *Improving Risk Communication* (National Academies Press 1989) 21.

According to this definition, risk communication not only connects risk assessors (scientists) and risk managers (regulators), but also works as a bridge between experts and the general public. It is a process that links all actors involved in the practice of risk regulation.

In order to discuss the role of risk communication in risk regulation, I should also define 'risk regulation'. My understanding of risk regulation is very close to the meaning adopted by Hood, Rothstein and Baldwin, as 'governmental interference with market or social processes to control potential adverse consequences'[44], although in my analysis I also look at the economic view of risk, in which risk regulation is not only focusing on 'adverse' consequences. I should also note that this definition of risk regulation is rather 'state-centred', especially compared to the broader notion of 'risk governance' that seeks to include a much wider range of actors into the risk-related policymaking process.[45] For the purpose of clarity, in this thesis I try to avoid using the language of 'governance'. However, it is worth noting that because the literature of risk governance stresses the roles of various actors in the decision-making process related to risk, 'risk communication' is also considered as a central element in their 'risk governance framework'.[46]

A more focused, state-centred definition of risk regulation is helpful, in particular in the context of the EU, as deregulation and privatisation in Europe has paradoxically created the conditions for the rise of 'regulatory state'.[47] In fact, the emphasis on

[44] Hood, Rothstein and Baldwin (n 38) 1; Heyvaert (n 38).

[45] Renn (n 10); Ortwin Renn, Andreas Klinke and Marjolein Asselt, 'Coping with Complexity, Uncertainty and Ambiguity in Risk Governance: A Synthesis' (2011) 40 AMBIO 231.

[46] Renn (n 10).

[47] Giandomenico Majone, 'The Rise of the Regulatory State in Europe' (1994) 17 West European Politics 77.

governmental interference is particularly evident in policy areas related to risk, with the EU food safety regime as a prime example. The power of regulating food-related risks in the EU is shared between the European Food Safety Authority (EFSA), other EU institutions and national governments. The Regulation Establishing the EFSA[48] defines 'risk analysis', the key practice of risk regulation, as 'a process consisting of three interconnected components: risk assessments, risk management and risk communication.'[49] In this context, 'risk communication' is described as including all exchanges of information throughout the whole process of risk analysis, covering both risk assessment and risk management.[50] Risk communication is a crucial component of risk regulation.

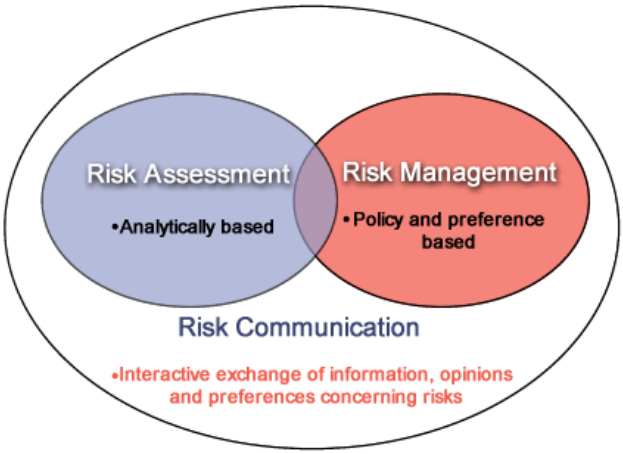

Figure 2.1 Three components of risk analysis[51]

[48] Regulation (EC) 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety [2002] OJ L31/1(EFSA Regulation)

[49] EFSA Regulation art 3(10).

[50] EFSA Regulation art 3(13).

[51] US Army Corps of Engineers, 'What is Risk Analysis?' <http://www.corpsriskanalysisgateway.us/lms/course.cfml?crs=10&crspg=95> accessed 8 July 2015; Alberto Alemanno, *Trade in Food: Regulatory and Judicial Approaches to Food Risks in the EC and the WTO* (Cameron May 2007) 81. The framework is also used by the CAC (Codex Alimentarius Commission), the EFSA and several governmental agencies.

While this three-component framework shown in Figure 2.1 is adopted in many areas of risk analysis, it presupposes a contested functional differentiation between 'risk assessment' and 'risk management'. The EFSA Regulation clearly shows this distinction, by defining 'risk assessment' as 'a scientifically based process' and 'risk management' as 'the process, *distinct from risk assessment*, of weighing policy alternatives'.[52] The above risk analysis framework thus divides the process of risk regulation into two functional spheres, i.e. the science-based risk assessment and the policy-based risk management.[53] In the EU food safety regime, risks related to food are first identified scientifically by the EFSA, the 'risk assessor', and then relevant policies are decided by the EU or other national governments, as 'risk managers', presenting a linear and rather simplistic model of scientific advisory. Unsurprisingly, many commentators find this clear-cut functional separation with a strict temporal sequence in decision-making unrealistic and questionable, especially for the purpose of extremely complex risk regulation.[54]

To avoid this contested conceptual distinction between risk assessment and risk management in risk regulation studies, it is also helpful to use 'risk communication' as an analytical device that encompasses all interactions involved in a process of risk regulation. The process of risk regulation is about how scientists and regulators, as

[52] EFSA Regulation art 3(11)-(12) (emphasis added).

[53] For example: Alemanno (n 51) 78–92, 387–391; Ortwin Renn and Peter Graham, 'Risk Governance: Towards an Integrative Approach' (IRGC 2006) 64–66; FAO and WHO, *Codex Alimentarius Commission: Procedural Manual* (20th edn, Codex Alimentarius Commission 2011) 105–110, 112. Jonathan B Wiener, 'Risk Regulation and Governance Institutions' in OECD (ed), *Risk and Regulatory Policy: Improving the Governance of Risk* (OECD 2010) 133, 140

[54] For example: Fisher (n 3) 160; Alemanno (n 51) 94–103; Ragnar E Lofstedt, 'Risk Communication and Management in the 21st Century' (2004) 7 International Public Management Journal 335, 342–343; Maria Lee, *EU Regulation of GMOs: Law and Decision Making for a New Technology* (Edward Elgar 2008) ch 2–3.Giandomenico Majone, 'Foundations of Risk Regulation: Science, Decision-Making, Policy Learning and Institutional Reform' (2010) 1:1 EJRR 5, 17; Gregory Bounds, 'Challenges to Designing Regulatory Policy Frameworks to Manage Risks' in OECD (ed), *Risk and Regulatory Policy: Improving the Governance of Risk* (OECD 2010), 21

different actors taking part in a regulatory process, interact with each other. Risk communication is exactly about these interactions. Thus analytically, thinking about risk communication can provide a more grounded approach to examine the practice of risk regulation than using risk assessment and risk management as analytical units.

In short, the critical role of risk communication in risk regulation is twofold: in terms of regulatory practice, risk communication is the central component that links various actors, provides transparency, promotes deliberation and facilitates public trust;[55] in terms of academic research, risk communication is an analytical focus that covers all activities of interest to the study of risk regulation. Therefore, it makes sense to talk about risk communication both *practically* and *academically*, as it lies at the heart of risk regulation. Current research on risk communication, based on the foundation of risk perception studies, has developed into a special field in its own right, but focuses only on a narrower perspective of risk communication.

2.2 Beyond the traditional expert/lay risk communication

This thesis discusses 'risk communication' broadly and emphasises its analytical potentials. The mainstream of contemporary risk communication research, however, tends to overlook this theoretical perspective and speaks of risk communication as a policy toolkit. Moreover, current studies of risk communication concentrate almost solely on risk communication activities between regulators and the general public. I argue that the study of risk communication should go beyond this narrow focus of 'expert/lay' relationships and include also 'inter-expert' risk communication.

Contemporary risk communication research is derived from earlier works of risk perception studies from the late 1970s, which were conducted by psychologists and

[55] Alemanno (n 51) 206–210; Renn and Graham (n 53) 54f; Fisher (n 3) 20–33.

sociologists who focused on how different members of society understand certain risks differently, and sought to ascertain the reasons for such different understandings among the general public.[56] This emphasis on risk perception originated from a naïve realist ideal of a scientific/managerial perspective of risk studies that sees 'risk' as something that can be 'objectively' measured.[57] Risk perception studies as such are rooted in empirical findings that reveal the disparity of perceptions between 'subjective' lay values and 'objective' regulatory expertise.[58] In short, the dominant literature focuses on the cognitive differences, or 'risk perception gaps', between experts and lay people.

The observation of risk perception gaps soon developed into a new school of risk communication research to 'close the gaps'. This intention has marked a significant shift of the purpose of risk communication, from being merely the exchange of information to aiming at changing behavioural responses,[59] or simply put, it is a shift from 'communication' to 'persuasion'. Such kind of 'active' risk communication is said to have three major purposes, to:

- make sure that all receivers of the message are capable of understanding and decoding the meaning of the messages sent to them;
- persuade the receivers of the message to change their attitudes or their behaviour with respect to a specific cause or class of risk; and
- provide the conditions for rational discourse on risk issues so that all affected parties can take part in an effective and democratic

[56] Frederic Bouder and Ragnar E Lofstedt, 'Improving Health and Safety: An Analysis of HSE's Risk Communication in the 21st Century' (Health and Safety Executive 2005) 7–13; Ragnar E Lofstedt, 'How Can We Make Food Risk Communication Better: Where Are We and Where Are We Going?' (2006) 9 Journal of Risk Research 869, 870–871; The Royal Society (n 12) ch 5.Frederic Bouder, 'Can Practitioners Do Better at Risk Communication? Using Evidence to Develop Best Practice' (2010) 1:3 EJRR 280

[57] Lupton (n 2) 17–24; Adams (n 12) ch 1 and 2; The Royal Society (n 12) 94f.

[58] Slovic, 'Perception of Risk' (n 16); Jaeger and others (n 9) 127; Baruch Fischhoff, 'Risk Perception and Communication' in Roger Detels and others (eds), *Oxford Textbook of Global Public Health* (OUP 2015) Section 7.6.

[59] Jaeger and others (n 9) 128; National Research Council (n 43) 19–23.

conflict-resolution process.[60]

Contemporary risk communication research therefore has established its own focus on modelling risk communication activities between people and governments, analysing the causes of risk perception gaps, observing the influence of media, language and culture on risk debates, as well as contributing to the formation and reform of risk policy in general. Empirically based on *psychological approaches*, these works use methods such as 'fatality estimations' (building the relations between subjectively 'estimated' and statistically 'real' fatality rates in various risk issues), 'psychometric diagrams' (two-dimensional diagrams showing how various risks are labelled or ranked by different people) or the 'mental models approach' (evaluating lay risk perceptions by comparing with 'mental models' from experts).[61] These results highlight the variation of risk perceptions among individuals and lead to a sometimes misleading debate about a perceived science/democracy dichotomy in risk regulation studies.

However, it is now generally recognised that, due to the limits of science and the inevitable fact that 'risk' is subjected to human interpretation, the alleged distinction between an objective 'actual' risk and a subjective 'perceived' risk should be treated critically.[62] Risk perception gaps should be analysed as 'the conflict between two sets of risk perceptions: those of ranking scientists performing within their field of expertise and those of anybody else.'[63] This therefore gave rise to a new approach of risk communication studies, the social/cultural approach, which seeks to make sense

[60] Jaeger and others (n 9) 129.

[61] For brief introduction of these methods: The Royal Society (n 12) 98–108 and 121–123; Slovic, 'Perception of Risk' (n 16); M Granger Morgan and others, *Risk Communication: A Mental Models Approach* (1st edn, CUP 2001) ch 2.

[62] The Royal Society (n 12) 97 and 103; National Research Council (n 43) 211f; Lee (n 54) 243f.

[63] National Research Council (n 43) 270.

of risk perception gaps in social and cultural contexts. It challenges the orthodox psychological methods by using culture theories and the 'grid-group model' to demonstrate how social and cultural biases can be associated with differences in risk perception.[64] Through identifying the outer boundary of a social community ('group') together with its social constrains and delegation of authority ('grid'), researchers found that people in hierarchical societies (high-grid/high-group) express very different risk decisions and perceptions from those in individualist societies (low-grid/low-group).[65] This interdisciplinary work of risk communication has produced many findings, including the dilemma of communicating scientific uncertainty, the process of social amplification as transmitters of risk messages, the problem of stigmatising risk-related issues, and the relationship between public's (dis)trust and regulator's credibility.[66] These studies have placed risk communication in a wider social context.

Although the tension between 'hard' (scientific, managerial and psychological) and 'soft' (social and cultural) approaches to risk communication continues, it is not the major focus of my thesis.[67] Both hard and soft approaches, in fact, draw attention to the importance of 'good risk communication' in a practical sense, and propose policy implications around notions such as 'trust'[68] and 'effectiveness'[69]. Therefore,

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[64] Douglas and Wildavsky (n 6); Douglas (n 6). For brief introduction of the cultural theory of risk: The Royal Society (n 12) 111–113; Jaeger and others (n 9) 188.

[65] Douglas and Wildavsky (n 6) 138–140; Lupton (n 2) 49–57.

[66] The Royal Society (n 12) 114–118; Lofstedt, 'How Can We Make Food Risk Communication Better' (n 56) 871–882.

[67] Adams (n 12) ix. It is of course an important theoretical background to understand my empirical data, but my main research question is not to take side in this theoretical debate.

[68] Slovic, 'Perceived Risk, Trust, and Democracy' (n 16); Lofstedt, 'Risk Communication and Management in the 21st Century' (n 54); Ragnar EE Lofstedt, *Risk Management in Post-Trust Societies* (Earthscan 2012) 8–9 and 125–134.

[69] For example: W Leiss, 'Three Phases in the Evolution of Risk Communication Practice' [1996] The Annals of the American Academy of Political and Social Science 85; Baruch Fischhoff, 'Risk

despite substantial epistemological differences within the risk perception school, studies of risk communication tend to have a more practical orientation that seeks to bridge the gap between experts and lay people. The key questions of current risk communication research are questions about 'expert/lay risk communication' — the discussion about risk between scientists and policymakers on the one hand, and the general public on the other. Mainstream risk communication studies have developed a whole set of methods that enable researchers to empirically examine risk communication activities between governments and the public.

Yet according to the definition adopted by the NRC that I introduced at the very beginning of this section, the discussion about risk between scientists, regulators and other policymakers is also by definition 'risk communication'. These activities of risk communication among experts, collectively called 'inter-expert risk communication', are rarely investigated by researchers interested in risk communication. Several key scholars in this field have noticed this gap. For example, Ortwin Renn comments that the 'internal' risk communication that '[facilitates] an exchange of information among risk professionals has often been underestimated in the literature'.[70] Ragnar Löfstedt also proposes a broader understanding of risk communication, as it is 'not a top-down form of communication from experts to the lay public, but rather a constructive dialogue between all those involved in a particular debate about risk'.[71] Moreover, some empirical studies have also suggested that biases and disagreements in expert

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Perception and Communication Unplugged: Twenty Years of Process1' (1995) 15 Risk analysis 137; Renn (n 10) 242f.

[70] Renn (n 10) 202. Also see OECD, 'OECD Guidance Document on Risk Communication for Chemical Risk Management' (OECD 2002) Environment, Health and Safety Publications Series on Risk Management No 16, 52–53.

[71] Lofstedt, 'How Can We Make Food Risk Communication Better' (n 56) 871.

judgments, sometimes overconfidence, are often found.[72] One recent study about public perception of climate change risks has found that it is someone's cultural background, instead of science literacy, that affects risk perception, which again supports the above critique that emphasising only risk perception gaps between experts and lay people is problematic.[73] Therefore, I argue that the 'inter-expert' aspect of risk communication is important, not only because it is empirically less researched, but also because it is essential to fully appreciate the analytical potential of risk communication in the study of risk regulation. A good starting point to examine inter-expert risk communication is to focus on the process of setting risk regulation standards.

2.3 Focusing on risk regulation standard-setting

Having established inter-expert risk communication as a key analytical unit, I now clarify *what* actual activities of inter-expert risk communication this thesis will examine. As introduced in Chapter 1, I focus empirically on analysing inter-expert risk communication in relation to two specific processes of setting risk regulation standards — the creation of the 2-degree climate target (the climate case) and the negotiation of the EMU fiscal rules (the euro case). The process of risk regulation standard-setting involves many formal and informal interactions between scientific experts and policymakers, providing rich data sources within a well-defined scope of empirical inquires about inter-expert risk communication.

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[72] The Royal Society (n 12) 107; W Bruine De Bruin and others, 'Expert Judgments of Pandemic Influenza Risks' (2006) 1 Global Public Health 179. M Granger Morgan and David W Keith, 'Subjective Judgments by Climate Experts' (1995) 29:10 Environmental Science and Technology 468

[73] Dan M Kahan and others, 'The Polarizing Impact of Science Literacy and Numeracy on Perceived Climate Change Risks' (2012) 2 Nature Climate Change 732.

Standard-setting is the core of many regulatory regimes.[74] Standard-setting procedures, according to Baldwin, Cave and Lodge, can involve intensive negotiation and compromise, may be influenced by the politics of the regulatory regime and the general political environment, and most importantly, they should not be reduced to purely 'mechanical' processes.[75] More specifically in terms of risk regulation, looking at standard-setting, as Fisher points out, can shed light on the institutional context of public administration: it has a specific socio-political aspect in finding an acceptable risk, it is a rather resource-intensive process of risk evaluation, it needs inputs from different fields of expertise, and it requires communication between actors involved.[76] The process of risk regulation standard-setting offers a rich site for the analysis of inter-expert risk communication.

On top of its analytical thickness, focusing on risk regulation standard-setting also provides a clearly defined scope for designing case studies. My thesis analyses inter-expert risk communication activities regarding the making of two specific risk regulation standards — the 2˚C temperature target of EU climate actions and the 3% deficit/60% debt to GDP ceilings of the Excessive Deficit Procedure of the EMU. There were intensive dialogues between technical experts, specialised policymakers and politicians throughout the formation of these risk regulation standards. In the climate case, the 2-degree target was formally adopted for the first time in 1996 by the Council;[77] in the euro case, the EMU fiscal rules were enshrined in the Maastricht

[74] Colin Scott, 'Standard-Setting in Regulatory Regimes' in Robert Baldwin, Martin Cave and Martin Lodge (eds), *The Oxford Handbook of Regulation* (OUP 2010).

[75] Robert Baldwin, Martin Cave and Martin Lodge, *Understanding Regulation: Theory, Strategy, and Practice* (2nd edn, OUP 2012) ch 14.

[76] Fisher (n 3) 18–21.

[77] Council of the EU, 'Community strategy on climate change – Council conclusions' (25-26 June 1996) 1939th meeting, 8338/96.

Treaty in 1992.[78] Many reports and papers prepared by various EU/national actors had contributed to the genesis of these two particular risk regulation standards. All these relevant documents, as actual risk communication activities among experts, are part of the risk regulation standard-setting process that translates evaluation of risk into concrete standards, and will be included in my analysis.

Besides looking at official documents as written communications, there are of course also oral communications concerning the creation of these two risk regulation standards in the EU. Inter-expert risk communication takes place both *within* expert bodies such as the European Environment Agency, the Monetary Committee and the DGs of the Commission, as well as *between* different EU/national bodies. Formal oral discussions related to risk regulation standards were noted as meeting minutes, while other 'informal' discussions can be revealed through interviews with experts involved. Concentrating on risk regulation standard-setting can also lead to a more focused analysis when searching minutes and conducting interviews. More details about data sources and data collection are explained in the Appendix.

To summarise, empirically I will examine risk communication activities among experts in the EU regarding the formation of two risk regulation standards, including written and oral, formal and informal communications. The focus on risk regulation standard-setting provides relatively clear empirical boundaries for my case studies, and the 'inter-expert' aspect of risk communication is of analytical importance yet rarely studied in the literature. In order to understand how the process of inter-expert risk communication contributes to the construction of different risk conceptions, I will analyse my data through an *institutionalist* approach, drawing on both historical institutionalism and sociological institutionalism.

[78] TFEU art 126 (ex TEC art 104) and Protocol No 12.

3. Historical and Sociological Institutionalism

Inter-expert risk communication will be studied through an analytical lens that mixes historical institutionalism and sociological institutionalism, two of the three schools of 'new institutionalisms'.[79] But before saying anything about different institutionalist approaches, it makes sense to clarify what I mean by 'institutions'. In this thesis, I see risk conceptions, i.e. the paradigmatic views of risk, as institutions that guide experts' decisions about risks. My central argument is that *a particular view of risk will become entrenched and 'institutionalised' through the process of inter-expert risk communication*, and I seek to demonstrate this by comparing two case studies related to risk regulation standard-setting in the EU.

The EU is one of the most heavily institutionalised polities in the world, and the study of institutions has clearly become a well-established field in European studies.[80] Institutions are often defined as 'a relatively stable collection of practices and rules defining appropriate behaviour for specific groups of actors in specific situations'.[81] In a much broader definition, institutions can be understood as simply 'the building blocks of social and political life', which cover the informal or even cultural features of institutions.[82] By thinking about views and conceptions of risk as institutions, this

[79] The third school is rational choice institutionalism. For detail introduction of these three schools: Peter A Hall and Rosemary CR Taylor, 'Political Science and the Three New Institutionalisms' (1996) 44 Political Studies 936.

[80] Mark A Pollack, 'The New Institutionalisms and European Integration' in Antje Wiener and Thomas Diez (eds), *European Integration Theory* (2nd edn, OUP 2009); Mark Aspinwall and Gerald Schneider, 'Institutional Research on the European Union: Mapping the Field', *The rules of integration: Institutionalist approaches to the study of Europe* (Manchester University Press 2001).

[81] James G March and Johan P Olsen, 'The Institutional Dynamics of International Political Orders' (1998) 52 International Organization 943, 948.

[82] Walter W Powell and Paul J DiMaggio (eds), *The New Institutionalism in Organizational Analysis*

thesis focuses on the broader and more abstract meaning of institutions. The key objective of my thesis is to show how the four key 'features' of the social/economic view of risk introduced above in Section 1 are enhanced and adopted by experts in two different scenarios, and thus turned into the 'building blocks' of risk-related public policymaking.

To this end, both the sociological and historical schools of new institutionalism are important. Scholars from a sociological background tend to expand the scope of their institutional analyses beyond formal rules and procedures, including wider concepts such as cultures, shared values or ideas.[83] This allows me to see 'views' of risk as institutions. Others focus more on the historical dimension and stress the role of historical background, temporality and sequences in institutional analysis.[84] This allows me to analyse inter-expert risk communication as a process that shapes risk conceptions. My analytical approach is therefore a special blend of both historical and sociological institutionalism.

3.1 Historical institutionalism: path dependence of risk communication

Historical institutionalism, in short, focuses on 'the effect of institutions over time.'[85] My institutionalist approach is *historical* at three levels. First of all, the two cases of risk regulatory standards took place in the 1990s and are entangled with the history of European integration. Drawing on historical events of risk evaluation, rather than current, on-going debates of risk policies, gives us a better view to observe risk

(University of Chicago Press 1991) 3.

[83] Hall and Taylor (n 79) 946–950.

[84] ibid 937–942.

[85] Pollack (n 80) 127; Paul Pierson, *Politics in Time: History, Institutions, and Social Analysis* (Princeton University Press 2004) 1–16.

communication activities in a reasonable (but not too remote) distance with well-defined scopes. Looking at the past EU risk policies, my research is historical in an 'empirical' sense.

Secondly, the analysis of risk communication, or the field of communication studies in general, is about temporal sequences. It seems self-evident that an act of 'communication' cannot be properly understood without looking at the process of sending, transmitting and receiving messages, as well as the subsequent dialogues triggered by that particular action of communication. The enormously rich literature of communication theories has drawn a lot of attention to processes, sequences and dialogues.[86] Naturally, my analysis in this thesis about risk communication activities among experts will involve how the two sets of standards were gradually formulated throughout the chains of discussion between various actors. In order to examine the practice of risk communication in different fields of expertise, my research has to be historical in a 'methodological' sense.

The third aspect of historical analysis reflects the changing nature of risk and my hypothesis about the two divergent risk conceptions. Many studies have shown that concepts of risk have changed significantly over time.[87] For example, the modern concept of risk moved away from the fatalist attitude toward hazard, through the development of probability theory;[88] yet with fast-advancing science and technology, the public started to associate risk with uncertainty, danger and fear, rather than economic analyses of costs and benefits.[89] A key objective of my research is to

[86] Robert T Craig, 'Communication Theory as a Field' (1999) 9 Communication Theory 119. This is a classic paper of communication theories that attempts to reconstruct the diverse traditions of communication studies as a more coherent field of study.

[87] Lupton (n 2); Adams (n 12); Douglas and Wildavsky (n 6).

[88] Bernstein (n 5); Covello and Mumpower (n 8).

[89] Douglas and Wildavsky (n 6); Sunstein (n 28).

demonstrate how a particular conception of risk can be shaped over time — starting from tracing processes and sequences of risk communication at a micro level, and moving toward the temporal relations between expertise and paradigmatic views of risk in risk regulation. As such, this thesis is historical in a 'theoretical' sense.

These three levels of 'historical turns' explain why I choose to adopt historical institutionalism in my analysis. As Paul Pierson argues fiercely in *Politics in Time*, '[t]he best case for connecting history to the social sciences is neither empirical nor methodological, but theoretical.'[90] Given a limited time frame and relatively confined case studies, my research does not seek to propose a grand theory of the evolution of risk, yet the concerns about institution, temporality and their interaction are undoubtedly central to my analyses. The two-case comparison seeks to delineate the dynamic interaction between a particular worldview of risk and the practice of risk communication, or in Pierson's words, to further unpack the simple declaration of 'history matters'.[91]

Therefore, I use historical institutionalism for two analytical purposes. The first one is to generally understand how inter-expert risk communication can be shaped by historical contexts. This is done in Chapter 3, by analysing the historical background of the two case studies. The second and more specific purpose is related to the notion of *path dependence*. Historical institutionalism puts much emphasis on the correlation and interactions between institutions and political processes, characterised by Pierson as 'positive feedbacks'.[92] Pierson argues that timing and sequencing of historical events shape the development of politics and provide incentives for actors to continue

[90] Pierson (n 85) 5.

[91] ibid.

[92] Pollack (n 80) 127–128; Paul Pierson, 'Increasing Returns, Path Dependence, and the Study of Politics' (2000) 94 The American Political Science Review 251.

down the same path, which leads to a phenomenon of 'path dependence' (or what economists call 'increasing returns').[93] However, the concept of path dependence has to be understood in a narrower sense. For Pierson, path dependent does not simply mean history matters, but has a deeper economic argument that past events have led to high costs of reversal or deviation, which then trigger a self-reinforcing positive feedback.[94] Yet instead of enhancing continuity and creating lock-ins for existing structures, other scholars claimed that history also generates pressures for changes as negative feedbacks.[95]

Although using the language of 'feedback' to discuss path dependence may seem convincing at first glance, it soon becomes confusing when one compares it with the notion of feedback mechanism in other fields.[96] To avoid confusion, I will guard against using terms such as feedback or increasing returns. But this does not mean that I define path dependence loosely. In my analytical chapters, path dependence explains how different views of risk are 'institutionalised' through the process of inter-expert risk communication, and eventually developed into 'paradigmatic' risk conceptions. While Pierson's theory of path dependence builds on economic and 'rationalist' ideas, my take on path dependence in this thesis is associated more closely with the social constructivist tradition, which leads me to include also

[93] Pierson (n 92).

[94] ibid.

[95] Pollack (n 80) 128; Wolfgang Streeck and Kathleen Thelen, 'Introduction' in Wolfgang Streeck and Kathleen Thelen (eds), *Beyond Continuity: Institutional Change in Advanced Political Economies* (OUP 2005) 3.

[96] In terms of engineering or biology, a positive feedback is a self-enhancing loop that can destabilise or destroy a system, while a negative feedback is a stabilising mechanism that maintains a system. Studies of politics use these terminologies in a completely opposite sense: positive feedbacks strengthen institutions and provide continuity, while negative feedbacks introduce changes to institutions. Haas also made a similar critique: Ernst B Haas, 'Introduction: Institutionalism or Constructivism?', *The Uniting of Europe: Political, Social, and Economic Forces, 1950-1957* (first published 1958, University of Notre Dame Press 2004) *xxiii.

sociological institutionalism.

3.2 Sociological institutionalism: the construction of risk conception

Blending historical and sociological institutionalisms makes sense, because these two schools share some commonalities. Historical institutionalists take a position in the middle of the rationalist-constructivist spectrum, thus linking both rational choice and sociological institutionalisms.[97] Path dependence, on the one hand, can be explained through an economic approach that analyses how costs influence agents' choices and create 'lock-in', with the development of the QWERTY keyboard being a classic example.[98] On the other hand, the idea of path dependence can be also discussed in sociological terms, by looking at how shared cultural understandings lead to 'isomorphism' in the evolution of organisations.[99] In fact, both sociological and historical institutionalisms emphasise the temporal aspects of institutional analysis.[100] Both schools, contrary to rational choice institutionalism, stress the role of pre-existing institutional templates in the formation and evolution of new institutions.[101] By including both approaches, my analysis can therefore explain how the processes of risk communication construct specific features of risk conceptions among experts.

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[97] Kathleen Thelen, 'Historical Institutionalism in Comparative Politics' (1999) 2 Annual Review of Political Science 369. This review paper discuss how historical institutionalism overlaps with the other two schools of new institutionalism and helps 'border crossers' with their analyses that break the disciplinary boundaries.

[98] ibid 384–386; Pierson (n 85) ch 1; Paul A David, 'Clio and the Economics of QWERTY' (1985) 75 The American Economic Review 332.

[99] Thelen (n 97) 386–387; Paul J DiMaggio and Walter W Powell, 'The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields' in Walter W Powell and Paul J DiMaggio (eds), *The New Institutionalism in Organizational Analysis* (University Of Chicago Press 1991).

[100] Aspinwall and Schneider (n 80) 14.

[101] Hall and Taylor (n 79) 953–955.

The sociological approach is helpful to my analysis in three interlinked aspects. First of all, as mentioned, sociological institutionalists take a much broader view of institutions. They tend to challenge the conceptual divide between 'institutions' and 'culture', and argue that cultural templates or scripts provide 'frames of meaning', as institutions, that guide individual actions.[102] 'Institutionalisation', in this sense, is a cognitive process that takes place not only within organisations, but also at the broader sectoral/social levels.[103] This broadened definition of institutions allows me to look at 'views' of risk as sense-making templates with specific features, and to analyse risk conceptions as emerging institutions.

Secondly, sociological institutionalism emphasises the interactive and mutually-constitutive nature of the relations between institutions and behaviours. Scholars tend to focus on the role of institutions as 'cognitive scripts' that assign meaning to social life, and follow a 'cultural approach' that explains how elements of institutions are constructed by collective action.[104] Thus in my case studies, I seek to examine and interpret inter-expert risk communication as a collective way of thinking and talking about risk among experts, through which the construction of two divergent risk conceptions can be explained.

This brings me to the final and perhaps most important aspect of sociological institutionalism — its close link with social constructivism. Change and continuity of institutions are interpreted as maintaining 'social appropriateness' or 'legitimacy', whereas institutions are considered as emerging 'from a more interactive process of discussion among the actors in a given network'.[105] The notion of socially

[102] ibid 947–948.

[103] Powell and DiMaggio (n 82) 11–27.

[104] Hall and Taylor (n 79) 939–940, 948–949.

[105] ibid 949–950; Walter W Powell, 'Expanding the Scope of Institutional Analysis' in Walter W

constructed institutions is important to my analysis, because while most institutionalist studies look at how 'institutions affect outcomes', constructivists also analyse institutions *as* outcomes of social actions.[106] Therefore, sociological institutionalism offers me a lens to investigate how discussions among experts about risk can become internalised, institutionalised and eventually lead to the construction of the social and the economic views of risk in my two case studies.

In summary, combining historical and sociological institutionalisms allows me to analyse how the process of inter-expert risk communication creates path dependence, how a particular view of risk is enhanced through risk communication activities, and how different features of the social/economic view of risk are constructed and turned into two divergent risk conceptions. My analytical approach therefore mixes 'history' and 'sociology', the two fundamental forms of social inquiry identified by Weber:[107] the former analyses individual actions and structures (the analysis of inter-expert risk communication), while the latter constructs concepts and typologies (the construction of the social and the economic views of risk). The two kinds of inquiries are indeed complimentary, especially in institutionalist approaches.[108] To empirically study the communication and conceptualisation of risk among experts in my two case studies, I further break down my investigation into four different analytical dimensions — networks, cultures, dynamics and strategies.

Powell and Paul J DiMaggio (eds), *The New Institutionalism in Organizational Analysis* (University Of Chicago Press 1991).

[106] Aspinwall and Schneider (n 80) 1, 13.

[107] Max Weber, *Economy and Society, Volume 1* (University of California Press 1978) 19–22.

[108] G John Ikenberry, 'Conclusion: An Institutional Approach to American Foreign Economic Policy' (1988) 42 International Organization 219.

4. Four Analytical Dimensions of Inter-Expert Risk Communication

Communication studies often analyse the process of communication by asking five questions: 'who, says what, in which channel, to whom, with what effect?'[109] While this classic '5-Ws model' offers some basic vocabularies to study communication, it is sometimes criticised as too linear and purely descriptive. In order to understand how risk communication activities can contribute to the conceptualisation of risk, I develop a different framework of analysis, building on the aforementioned historical and sociological institutionalism. Instead of looking directly at 'natural components' of risk communication (such as its participants, contents and media), I analyse the whole process of inter-expert risk communication from different perspectives, and propose four 'analytical dimensions' that focus on *networks* (the relations formed between experts), *cultures* (the shared mentalities developed among experts), *dynamics* (the changes and shifts in risk-related messages) and *strategies* (the methods used for discussing risks) of risk communication.

This final section introduces these four analytical dimensions. I should stress that these four dimensions are not 'real' dimensions or levels that exist in the reality of inter-expert risk communication — they are purely analytical constructs that provide thematic foci for my research. These different 'themes' of risk communication thus inevitably overlap, and as my analysis will show, they are deeply intertwined with each other. In other words, the four analytical dimensions examine actual behaviours and patterns of risk communication through a thematic approach, and explain how inter-expert risk communication entrenches different 'features' of risk conceptions. The first two dimensions, networks and cultures, deal mainly with the structures and

[109] Harold D Lasswell, 'The Structure and Function of Communication in Society', *The Communication of Ideas* (Institute for Religious and Social Studies 1948).

environments of risk communication, whereas the other two, dynamics and strategies, focus more on the actual processes of risk communication. I shall start with the most fundamental dimension of the network of risk communication actors.

4.1 Networks: the relationships between risk communication actors

Networks are about the relations and interactions between experts formulated through the process of risk communication. The analysis of networks is the first and the most basic analytical dimension, as it sketches out the fundamental structures of inter-expert risk communication. In order to delineate the risk communication networks formed in my two case studies, I draw on the literature of social network analysis[110] and seek to allocate experts along a 'science-policy' spectrum as well as to identify whether these experts constructed an 'open' or 'closed' network.

The study of networks, as scaffolds and carriers of institutional effects, is crucial to institutional analysis.[111] Moreover, by looking at networks through historical and sociological institutionalisms, I explain why a certain type of network was enhanced and became path dependent through risk communication, and how this continuity of network shaped and constructed different understandings of risk among experts. Both cases of inter-expert risk communication share similar historical contexts of post-Cold War globalisation and European integration, yet their networks evolved differently. The euro case was negotiated in a closed 'club' of EU experts, whereas the network of climate case can be described as an open 'bridge' between scientists and policymakers.

[110] Stephen P Borgatti and others, 'Network Analysis in the Social Sciences' (2009) 323 Science 892; Ronald S Burt, 'The Network Structure of Social Capital' (2000) 22 Research in Organizational Behavior 345.

[111] Jason Owen-Smith and Walter W Powell, 'Networks and Institutions' in Royston Greenwood and others (eds), *The Handbook of Organizational Institutionalism* (SAGE 2008).

The metaphors of bridge and club reflect not only the ways how experts positioned themselves among others in the network of risk communication, but also how they conceptualised risk, especially in terms of the 'expertise' and 'normality' of risk. The bridge network ensures the involvement of different scientific methods and imagines risk as something abnormal that requires intensive scientific assessment; the club network, on the contrary, highlights the centrality of economics and considers risk as normal activities of public policy that can be managed. Chapter 4 discusses these two networks in details.

4.2 Cultures: the mentalities of risk communication for persuasion

Both networks and cultures are about describing the general environment in which risk communication takes place. The analytical dimension of cultures, however, focuses more on the values and mentalities shared among actors of risk communication. In this sense, 'culture' can be understood as 'a particular world of beliefs and practices associated with a specific group'.[112] The empirical elements of different cultures of inter-expert risk communication include, for example, the personal beliefs of experts about risks, the ways experts actually seek to persuade each other, and the framing of risk-related messages.

As mentioned above, both historical and sociological institutionalisms highlight the importance of culture in institutional analysis.[113] In the literature of risk studies, the school of cultural analysis also emphasises the influences of different cultures on risk perceptions.[114] In this thesis, I focus particularly on analysing two cultures of risk

[112] Susan S Silbey, 'Legal Culture and Cultures of Legality' in John R Hall, Laura Grindstaff and Ming-Cheng Lo (eds), *Handbook of Cultural Sociology* (Routledge 2010) 470.

[113] Hall and Taylor (n 79) 939–940, 947–948.

[114] Douglas and Wildavsky (n 6).

communication adopted by experts for the purpose of 'persuasion'. While experts shared a similar belief in the power of persuasive risk communication, their actual practices of risk communication diverged in the two case studies. In the climate case, experts concentrated on getting the messages of climate change heeded and framed climate risk negatively, adopting a 'pessimistic' culture; in the euro case, experts tried predominantly to make the EMU work and thus framed their messages more positively, demonstrating an 'optimistic' culture. These two cultures, pessimism and optimism, show consistency and continuity in experts' patterns of risk communication in different cases. More importantly, they serve as 'cultural scripts' that lead to the construction of different risk conceptions, in particular different ways to approach the 'probability' and 'impact' of risk. Pessimism provides a template for seeing risks as inherently uncertain and potentially negative; optimism, on the other hand, promotes a view that risks are calculable, manageable and can bring potential benefits. Cultures are discussed further in Chapter 5.

4.3 Dynamics: the processes of transmitting risk-related messages

The analytical dimension of dynamics focuses on the actual processes of inter-expert risk communication. By 'dynamics' I mean the amplification and attenuation of risk-relevant messages. My analysis of dynamics thus draws heavily on the framework of 'social amplification of risk', which explains how messages about risk proliferate through media, networks and various social actions.[115] While the original theoretical framework of social amplification of risk looks at 'risk perception' in a quantitative

[115] Roger E Kasperson and others, 'The Social Amplification of Risk: A Conceptual Framework' (1988) 8 Risk analysis 177.

sense (whether messages of risk are strengthened or weakened),[116] my thesis examines the process of risk communication also qualitatively, by asking which aspects of risk messages are amplified/attenuated.

Clearly, the idea of dynamics is closely associated with the study of temporality, sequences and evolution of institutions. But dynamics, if analysed in a qualitative way, also reveal how a particular thinking of risk develops into a template that guides risk conceptions. While in both case studies, discussions about risk were narrowed down through risk communication for the purpose of standard-setting, the dynamics of risk communication went down different paths: risk was amplified in the climate case but attenuated in the euro case. To be specific, the 2-degree climate target strengthened the notion of climate risk, by aggregating different negative impacts into a scientific indicator; the EMU fiscal rules, however, weakened the perception of risk in the EMU debate, by reducing the issue of nominal convergence to monetary politics. The two different paths of amplification/attenuation reinforced different thinking about the 'normality', 'probability' and 'impact' of risk. Risk amplification creates a view that sees risk as abnormal, uncertain and potentially dangerous, whereas risk attenuation stresses the upsides of risk and considers risk management as part of normal routine of public policy. The two types of dynamics are further explained in Chapter 6.

4.4 Strategies: the justifications of arbitrary risk regulation standards

The final analytical dimension, strategies, investigates the outcomes of inter-expert risk communication in relation to the creation of the two risk regulation standards. Building on the previous three dimensions, the processes of standard-setting were influenced by the networks of experts, their cultures of risk communication and the

[116] Slovic, 'Perceived Risk, Trust, and Democracy' (n 16).

dynamics of risk communication activities. However, I should note that 'outcomes' of risk communication are not limited to the 'final results' as the 2-degree climate target and the EMU fiscal rules themselves, but also includes interim results and emerging consensuses. Tracing these outcomes and the arguments associated with them can demonstrate the 'strategies' adopted by experts in risk communication for justifying their decisions about risk regulation standards.

Strategies of risk communication are therefore about how experts make sense of their regulatory choices, and eventually how they conceptualise risk. The 2-degree target and the fiscal rules are both criticised as 'arbitrary'.[117] The final choices of the two risk regulation standards may seem arbitrary, but they were strategic choices, and for many experts, these choices were justifiable and reasonable. In the two cases, the 'strategic arbitrariness' is presented with subtle differences: in the climate case, the choice of 2˚C was backed by the concept of 'precaution', arguing that the 2-degree target was feasible and in line with the precautionary principle; in the euro case, the criteria of 3%/60% deficit/debt thresholds were justified by the power of 'prediction', claiming that the fiscal rules were sound budgetary benchmarks that conformed to cost-benefit analysis. The differences between precaution and prediction are nuanced but crucial to the construction of a social/economic view of risk, as they associated with all four 'features' of risk conception, i.e. expertise, normality, probability and impact. The notion of precaution stresses the uses and limits of sciences, sees risk as a special threat, highlights its uncertainty and focuses on the downsides; the notion of prediction, in contrast, emphasises the power of economic analysis, considers risk as

[117] Carlo C Jaeger and Julia Jaeger, 'Three Views of Two Degrees' (European Climate Forum 2010) ECF Working Paper 2; Beatrice Cointe, PA Ravon and E Guérin, *2˚C: The History of a Policy-Science Nexus* (IDDRI Working Papers 2011); Willem Buiter and others, 'Excessive Deficits: Sense and Nonsense in the Treaty of Maastricht' [1993] Economic Policy 58; Jan Viebig, *Der Vertrag von Maastricht: Die Positionen Deutschlands Und Frankreichs Zur Europäischen Wirtschafts- Und Währungsunion* (Schäffer-Poeschel 1999) 356–359.

part of public administration, downplays its uncertainty and foregrounds its benefits. Chapter 7 further examines the two strategies.

Table 2.2 summarises key contents examined through these four analytical dimensions of inter-expert risk communication, as well as their relations to the four features of risk conceptions. This table also sums up the whole structure of this thesis. By discussing one analytical dimension at a time, I can break down the rather complex process of risk communication and demonstrate thematically how risk communication activities built up two divergent risk conceptions. All these empirical analyses are based on two case studies, the promulgation of the 2-degree climate target and the EMU fiscal rules, which will be introduced in the next chapter.

Table 2.2: Four analytical dimensions explained

Dimension	Analytical focus	Relevant 'features' of risk conception
Networks	The relations formed between experts involved in risk communication	Expertise, Normality
Cultures	The mentalities of experts in terms of persuasive risk communication	Normality, Probability, Impact
Dynamics	The actual processes of transmitting risk-related messages	Expertise, Normality, Probability, Impact
Strategies	The justifications for the outcomes of risk communication	Expertise, Normality, Probability, Impact

Chapter 3
2˚C and 60 %: Histories of Two Risk Regulation Standards

In this chapter I discuss the history in relation to the risk communication processes in my two case studies, i.e. the creation of the 2-degree climate target (the *climate case*) and the EMU fiscal rules (the *euro case*). The purpose of this chapter is to provide a more comprehensive introduction to these two risk regulation standards, before I start my analysis of inter-expert risk communication. As explained in Chapter 1, I chose these two case studies because they reflect two very different conceptions of risk — experts in the climate case adopted a *social view* of risk, whereas those in the euro case took an *economic view* of risk. The core argument of this thesis is that through the process of risk communication, an initial view of risk adopted by experts will become 'institutionalised' and 'paradigmatic', as a standardised way of understanding risk in the practice of standard-setting.

To this end, I focus empirically on the *genesis* of risk regulation standards, because such a history provides insights into how abstract concepts like 'danger' or 'excessiveness' are crystallised into concrete legal norms. However, it is not always easy to mark the starting point of a standard-setting process. Therefore I will first present some earlier developments related to the two cases, and then describe the period of relatively intensive discussion where I lay my empirical focus. Moreover, I will also discuss why the two case studies reflect different views of risk. In addition, as part of my analysis draws on historical institutionalism and the concept of path dependence, it is also important to examine how historical events, as the background theme of my thesis, can shape risk communication activities.

Sections 1 and 2 will deal with the climate case and the euro case, respectively.

Section 3 will categorise historical events into *junctures*, *trajectories* and *legacies*, and examine their different influences on inter-expert risk communication in my two case studies on the fiscal rules and the 2-degree target.

1. The 2-Degree Target: Measuring Dangerous Climate Change

In December 2009, the 15th session of the Conference of Parties (COP) to the UN Framework Convention on Climate Change (UNFCCC) took place in Copenhagen and adopted the 'Copenhagen Accord'.[1] The Accord explicitly recognised 'the scientific view that the increase in global temperature should be below 2 degrees Celsius'.[2] This *2-degree target* has since then become a famous world recognised standard to combat climate change.

The 2-degree target provides a clearer definition to the 'ultimate objective' of the UNFCCC, i.e. to achieve 'stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system'.[3] It is characterised as '*the* scientific view' in the Accord. But what is the 'science' of 2℃? How did scientists and policymakers interact during the discussion of the 2-degree target? I will unpack the history of 2℃ in this section, and argue that by focusing on *dangerous* climate change, experts have adopted a social view of risk in the climate case.

[1] UNFCCC COP, Copenhagen Accord (7-19 December 2009) Decision 2/CP.15.

[2] Copenhagen Accord, para 1.

[3] UNFCCC art 2.

1.1 The early development of climate targets

Since the discovery of the 'greenhouse effect' by John Tyndall in the 19th century,[4] researchers in the field of climate change (or global warming in earlier years) have been studying the effects of greenhouse gasses (GHGs) to temperature. The 2-degree target is a product of this scientific inquiry. In 1896, Svante Arrhenius demonstrated the relations between CO_2 concentrations and temperature increases, and estimated that global surface temperature would increase by 5 to 6℃ should the atmospheric concentration of CO_2 be doubled.[5] This notion of *doubling of CO_2 concentrations* has since then been well established in academia, and several estimations were made throughout the 20th century.[6] These estimations were used to define *climate sensitivity* and ultimately the dividing line between 'dangerous' and 'safe'. The logic of 2℃ is therefore quite straightforward: it is an indicator of climate impacts that can define climate sensitivity, calculate emission profile and provide necessary information for mitigation options (Figure 3.1).

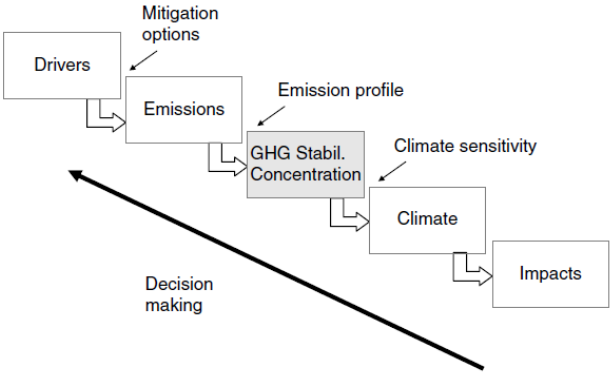

Figure 3.1: Stabilising concentrations of GHGs[7]

[4] Mike Hulme, 'On the Origin of "the Greenhouse Effect": John Tyndall's 1859 Interrogation of Nature' (2009) 64 Weather 121.

[5] Svante Arrhenius, 'On the Influence of Carbonic Acid in the Air upon the Temperature of the Ground' (1896) 41 Philosophical Magazine and Journal of Science 237, 265–267.

[6] Hartmut Grassel and Bert Metz, 'Climate Change: Science and the Precautionary Principle' in EEA (ed), *Late Lessons from Early Warnings: Science, Precaution, Innovation* (EEA 2013) 308, 311–314.

[7] 'Schematic drawing of stabilising concentrations of GHGs in the atmosphere and the upstream and downstream relationships with emissions, temperatures, and impacts': Bert Metz, *Controlling Climate*

The idea of using 2℃ as an indicator of climate sensitivity was further enhanced by economists. William Nordhaus, for example, used 2℃ and the doubling of CO_2 concentrations as references for conducting cost-benefit analysis about the economics of climate change policy, and concluded that rapid mitigation measures would be too costly.[8] In his work, 2℃ is not really a policy target, but an assumption for economic analysis, a 'heuristic tool' for calculating the costs of climate actions.[9] In fact, the concept of linking climate sensitivity with a doubling of CO_2 concentrations is based on heuristic, not a strictly scientific argument.[10]

Other researchers at the time also noticed this problem. They argued that the dominant method of climate sensitivity did not directly answer the question of what is 'safe', and proposed a way to define dangerous climate change directly based on evidence relating to geological history.[11] This is a valid critique, since there is no compelling scientific reason to support the idea that a doubling of CO_2 concentrations is actually 'dangerous'. But this alternative method is also criticised as poorly grounded — the 'science' of 2℃, be it based on climate sensitivity, cost-benefit analysis or geological history, seems to be thin and unfounded in general.[12]

Change (CUP 2010) 53.

[8] William D Nordhaus, 'Economic Growth and Climate: The Carbon Dioxide Problem' (1977) 67 The American Economic Review 341; William D Nordhaus, 'To Slow or Not to Slow: The Economics of The Greenhouse Effect' (1991) 101 The Economic Journal 920; William D Nordhaus, 'An Optimal Transition Path for Controlling Greenhouse Gases' (1992) 258 Science 1315.

[9] Samuel Randalls, 'History of the 2˚C Climate Target' (2010) 1 WIREs Climate Change 598; Beatrice Cointe, PA Ravon and E Guérin, *2˚C: The History of a Policy-Science Nexus* (IDDRI Working Papers 2011).

[10] ibid.

[11] WBGU, 'Scenario for the Derivation of Global CO2 Reduction Targets and Implementation Strategies' (WBGU 1995). The so-called 'inverse scenario' proposed by German scientists will be discussed in the next subsection.

[12] Richard SJ Tol, 'Europe's Long-Term Climate Target: A Critical Evaluation' (2007) 35 Energy Policy 424.

While scientific arguments behind the 2-degree target are covered with fog, it is relatively clear the target was formally adopted as a normative standard by the EU for the first time.[13] This was decided by the Council of Ministers in June 1996:

> The Council recognizes that, according to the IPCC S.A.R., stabilization of atmospheric concentration of CO_2 at twice the preindustrial level, i.e. 550 ppm, will eventually require global emissions to be less than 50% of current levels of emissions; such a concentration level is likely to lead to an increase of the global average temperature of around 2°C above the preindustrial level.
> […] the Council believes that global average temperatures should not exceed 2 degrees above the pre-industrial level and that therefore concentration levels lower than 550 ppm CO_2 should guide global limitation and reduction efforts.[14]

Notice that the Council backed up its choice of 2°C by referring to the Second Assessment Report (SAR) of the Intergovernmental Panel on Climate Change (IPCC). However, if one takes a closer look of the IPCC SAR, the report did not mention the 2-degree climate target as we understand it today. The key word 2°C did appear in the SAR, but the actual context was that according to its IS92a model, when the CO_2 concentration reaches 550ppmv, 'an increase in global mean surface air temperature relative to 1990 of about 2°C by 2100' was projected.[15] The EU and the IPCC were not talking about the same 2°C, because they used different bases (preindustrial or 1990) and different ways of specifying temperature change (at equilibrium or in 2100).[16] The IPCC SAR did not recommend 2°C as a climate target, because it is the

[13] Randalls (n 9); Cointe, Ravon and Guérin (n 9); Carlo C Jaeger and Julia Jaeger, 'Three Views of Two Degrees' (European Climate Forum 2010) ECF Working Paper 2; Tol (n 12).

[14] Council of the EU, 'Community strategy on climate change – Council conclusions' (25-26 June 1996) 1939th meeting, 8338/96, paras 5-6

[15] IPCC, 'Climate Change 1995: IPCC Second Assessment Report' (IPCC 1995) 5, 10, 23. 5, 10, 23.

[16] Cointe, Ravon and Guérin (n 9) 21; Robert Swart and others, 'The Safe Landing Approach: Risks and Trade-Offs in Climate Change' in Joseph Alcamo, Rik Leemans and Eric Kreileman (eds), *Global Change Scenarios of the 21st Century: Results from the IMAGE 2.1 Model* (Elsevier 1998). The latter article provides a more detailed review on the nuances between different versions of climate change temperature indicators noted in the IPCC and EU reports.

'mantra' of IPCC to be 'policy-relevant but not policy-prescriptive'[17] and to stay away from endorsing policy targets.[18] Therefore, one can interpret that the EU 2-degree target 'drew inspiration from' the IPCC SAR,[19] or say that the decision was 'in the light of the scientific evidence' provided by the IPCC',[20] but one cannot draw a direct link between the SAR and the 2-degree target.

In fact, archival records of the Council suggest that EU environment ministers at the time were well aware of the real meaning of the IPCC SAR — they knew the two '2°C' were not the same.[21] The Council still cited the IPCC report, probably because the 'science' behind the 2-degree target was pretty messy. As mentioned earlier, Cointe and others claim that there is no clear origin for 2℃, and argue that the target was based on neither scientific evidence nor policymakers' informed choice.[22] Tol, focusing on reviewing the science of 2℃, criticises that the 2-degree target was scientifically unfounded.[23] To many commentators, the genesis of the climate target has become a myth. But is it really just a myth?

1.2 Three science-policy interfaces in the EU

The 'myth' of 2℃ is probably based on three true stories of risk communication that are often neglected in the studies of climate policy. By comparing several historical

[17] Metz (n 7) 55.

[18] Randalls (n 9) 601.

[19] ibid.

[20] Grassel and Metz (n 6) 372.

[21] Council of the EU, 'Community strategy on climate change – Council conclusions' (25-26 June 1996) 1939th meeting, 8338/96; Council of the EU, 'Preparation of the "Environment" Council meeting on 25 June 1996' (Brussels, 11 June 1996) 8063/96.

[22] Cointe, Ravon and Guérin (n 9).

[23] Tol (n 12).

studies with my empirical data, I identify three groups of experts that are particularly crucial to the creation of the 2-degree target — the EU, the Dutch and the German groups. These three expert groups are particularly important to this case study because they made specific contributions to the 2-degree target through different routes, as all interviewees pointed the origin of the target to either one or all of these groups.[24] As many have argued, 2℃ can be understood as an 'interface' or a 'boundary object' between various scientific and political discourses.[25] Similarly, the three crucial groups of experts introduced here were also fora that provided the *interface* between science and policymaking, sometimes called 'boundary organisations'.[26]

EU experts

The first interface between science and policymaking was provided by the in-house experts of the EU. To be more specific, this interface included two scientific bodies, the *European Environment Agency* (EEA) and the *Ad Hoc Expert Group on Climate*, under the auspices of the Commission and the Council, respectively. Due to their proximity to the decision-making bodies of the EU, these groups have made direct contributions to the adoption of the 2-degree climate target.

The EEA, founded in 1994, issued its first general report on 'Europe's Environment' (the *Dobris Assessment*) in 1995,[27] one year before the 1996 Council Conclusions. In this report, one chapter (Chapter 27) was dedicated to climate change,

[24] The importance of these three groups specifically to the generis of the 2-degree target does not mean that other groups are not relevant in the whole climate change debate. My interviewees also noted many other key actors in climate research and climate policy in general, such as the IPCC, the Stockholm Environment Institute, the UK Tyndall Centre for Climate Change Research and the US National Oceanic and Atmospheric Administration.

[25] Cointe, Ravon and Guérin (n 9); Randalls (n 9).

[26] David H Guston, 'Boundary Organizations in Environmental Policy and Science: An Introduction' (2001) 26 Science, Technology, & Human Values 399.

[27] EEA, *Europe's Environment: The Dobris Assessment* (EEA 1995).

where 2℃ was suggested as a way to define dangerous climate change and to design emission reduction policy:

> As discussed in previous chapters, the biosphere cannot operate outside certain limits. To remain within these, as yet unknown, limits, absolute limits on the acceptable rise in temperature or sea level could be set. Analyses of past temperature and rises in the sea level show that an absolute temperature change of 2.0℃ relative to the pre-industrial era should be considered as a major risk. Considerable changes in ecosystems and sensitive coastal areas, as well as unexpected sudden changes in the climate system, cannot be ruled out given a temperature change of more than 2℃.[28]

It should be noted that although the EEA today is independent from the Commission, the preparation of the Dobris Assessment was deeply linked with the very founding process of the EEA. The 1995 report was thus prepared by the task force for the EEA (EEA-TF) *within* DG XI of the Commission. I should also note that in addition to 2℃, the report presented two other climate indicators: maximum rate of temperature rise (less than 0.1℃ per decade) and rate of change of sea level (limit of 2cm rise in sea level per decade).[29] All these three indicators were presented equally as options for further decision-making. Of course, the mere fact that the 1995 Dobris Assessment was published before the 1996 Council Conclusions does not mean that the EEA-TF was *the* source of 2℃. However, if one takes into account that the Dobris Assessment was a project initiated by the conference of European environment ministers at Dobris Castle (therefore the name of the report),[30] it seems clear that this report had some influences to the final decision of the Council of Ministers.

Comparing to the EEA-TF, the internal experts of the Council perhaps made an even more direct contribution to the 2-degree target. According to archival data, the Ad Hoc Group on Climate (sometimes also referred as ‘ad hoc group of experts’, ‘ad

[28] ibid 520.

[29] ibid 519–520.

[30] ibid preface.

hoc Group "Climate"' or simply 'ad hoc Group') prepared the drafts of the Council Conclusions.[31] Moreover, according to interviews, this group also formed the basis of the EU delegation team to the UNFCCC and worked closely with the Commission.[32] This link to the international level is crucial because the 2-degree target was, and still is, a major position of the EU in global climate negotiation.[33] The adoption of the climate target coincided with the preparation of the Kyoto Protocol from 1995 to 1997 at the international level. Therefore, although detailed archival data of the Ad Hoc Group on Climate was not available,[34] it is reasonable to believe that experts of the Council had contributed significantly to the 2-degree target.

Dutch experts

The second interface between science and policy-making was facilitated by the Dutch group that organised the *Delft process* in the 1990s. The Delft process was a series of five workshops promoting bilateral learning and dialogues between environmental scientists and policymakers.[35] Through these workshops, the so-called 'safe landing analysis' (SLA) was developed, in order to explore various climate indicators and possible policy options.[36] The SLA was widely accepted because 'it bridges the gap between policy needs and the understanding derived from complex but scientifically

[31] Council of the EU, 'Preparation of the "Environment" Council meeting on 25 June 1996' (Brussels, 11 June 1996) 8063/96; Council of the EU, 'Community strategy on climate change — Draft Council conclusion' (Brussels, 4 June 1996) 7925/96; Council of the EU, 'Preparation of the "Environment" Council meeting on 18 December 1995' (Brussels, 5 December 1995) 12407/95.

[32] Interviews with CM (2 April 2014), JP (6 September 2013) and JI (25 August 2013).

[33] Cointe, Ravon and Guérin (n 9); Randalls (n 9); Tol (n 12).

[34] This is due to the confidential nature of the Council deliberations. In fact, many interviewees have confirmed that these meetings were simply not recorded; Interviews with JP (6 September 2013), CM (2 April 2014), UG (1 October 2013), JI (25 August 2013) and KA (26 August 2013).

[35] C Els Van Daalen, Wil AH Thissen and Marcel M Berk, 'The Delft Process: Experiences with a Dialogue between Policy Makers and Global Modellers' in Joseph Alcamo, Rik Leemans and Eric Kreileman (eds), *Global Change Scenarios of the 21st Century: Results from the IMAGE 2.1 Model* (Elsevier 1998) 267.

[36] Swart and others (n 16).

rigorous integrated assessment models.'[37] In other words, the SLA is an approach to help translating results of scientific models and climate scenarios into a language that is good for public policymaking. The Delft process has thus facilitated the decision-making of the EU 2-degree climate target by promoting the SLA.

To be specific, the SLA is an interactive software tool that can draw a 'safe emission corridor' based on given data. The corridor is an image showing the amount of 'safe' emission allowed in the short and long term, in order to reach certain climate targets. Therefore, to generate a 'corridor', one must choose a climate model and specify a desirable outcome in the future. These 'outcomes' are climate indicators, such as rates of temperature change and levels of sea level rise. Unsurprisingly, an absolute change of 2℃ is on the top of the list (noted as 1.5℃ comparing to the 1990 level in the SLA framework; Figure 3.2).

In fact, the same Dutch group has proposed mean global temperature change as an indicator of dangerous climate change in its earlier report in 1990.[38] Rijsberman and Swart argued that a 'maximum temperature increase of 2.0°C above pre-industrial global mean temperature' should be set as an 'upper limit beyond which the risks of grave damage to ecosystems, and of non-linear responses, are expected to increase rapidly.'[39] They combined changes of global mean temperature with other indicators such as sea-level rise and CO_2 concentration, and later on formulated a 'traffic light system' for climate risk management (Figure 3.3).[40] Although actively promoting the use of climate indicators as policy targets, these reports made by the Dutch group

[37] ibid 193.

[38] Frank R Rijsberman and Rob J Swart (eds), *Targets and Indicators of Climatic Change* (Stockholm Environment Institute 1990).

[39] ibid 72.

[40] Rijsberman and Swart (n 38); Pier Vellinga and Rob Swart, 'The Greenhouse Marathon: A Proposal for a Global Strategy' (1991) 18 Climatic Change vii; RIVM, *The Environment in Europe: A Global Persepctive* (RIVM 1992) 28.

have never singled out 2℃ as the only climate target.

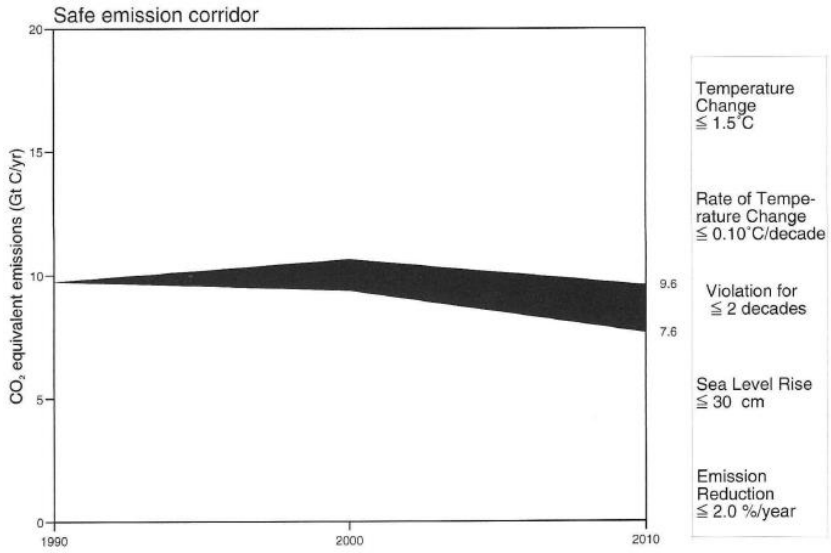

Figure 3.2: The global emission corridor for the EU objectives.[41]

Figure 3.3: The Dutch 'traffic light system'.[42]

Therefore, Dutch experts influenced the making of the EU 2-degree target in a subtle yet profound way. The Delft process provided a platform for policymakers to meet scientists, and together they developed the SLA, an interactive tool for

[41] Swart and others (n 16) 196 fig 1(B).

[42] Vellinga and Swart (n 40) x fig 2.

policymakers to test various climate targets. By using the SLA and trying several climate indicators suggested by scientists, the whole process helped policymakers decide whether one target is particularly feasible or justifiable. The workshops, the SLA and the traffic light system linked together as a complex interface that, as Swart suggests, provides an approach for policymakers to legitimise policy decisions.[43]

German experts

The third interface between science and policymaking, which relied on a method that was very different from the Dutch experience, was the German Advisory Council on Global Change (WBGU). As an independent scientific advisory body set up by the German federal government, the WBGU was influential in EU climate policy not just because of the political power of Germany in the EU, but also due to the fact that the First Conference of the Parties (COP 1) to the UNFCCC took place in Berlin in 1995. According to Schellnhuber, the then Deputy Chair of the WBGU and the Director of the Potsdam Institute for Climate Impact Research (PIK), he and his colleagues at the PIK explained their work and policy suggestions directly to Angela Merkel, the German Minister for the Environment at that time, in early 1995.[44]

The method presented by the WBGU/PIK is called the 'Tolerable Windows Approach' (TWA).[45] Through the TWA, the WBGU recommended two climate 'guardrails': confining the rise of global mean temperature to less than 2℃ above pre-industrial levels, and limiting the rate of temperature change to less than 0.2℃ per decade.[46] In a report published in 1995, the WBGU suggested that a *tolerable*

[43] R. Swart, P Raskin and J Robinson, 'The Problem of the Future: Sustainability Science and Scenario Analysis' (2004) 14 Global Environmental Change 137, 143.

[44] Hans Joachim Schellnhuber, 'Tragic Triumph' (2010) 100 Climatic Change 229.

[45] ibid; WBGU (n 11); WBGU, 'Targets for Climate Protection' (WBGU 1997).

[46] ibid.

temperature window should be defined by the principle of 'preservation of Creation', that is, by analysing paleoclimatic evidences, the highest and lowest temperatures occurred in the recent geological epoch should be set as the natural, safe temperature range for humanity.[47] Although the idea of safeguarding 'Creation' seems a bit non-secular,[48] the WBGU considered its scenario particularly suitable for climate negotiation because it was carried out in the 'backwards mode'. Compared to most climate models at the time that sought to calculate climate impacts 'forwards' through various emission scenarios, the TWA can provide a direct answer to acceptable climate condition, by looking 'backwards' at the geological history.[49] As Schellnhuber argues, the 'inverse scheme' (Figure 3.4) reflects better the ultimate objective of avoiding dangerous climate change stated in Article 2 of the UNFCCC.[50]

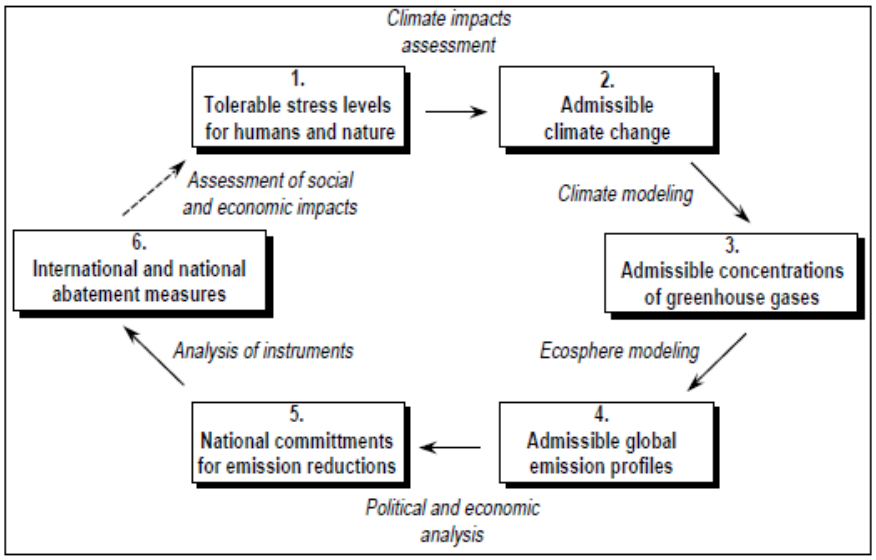

Figure 3.4: The WBGU 'inverse scenario'[51]

[47] WBGU (n 11) 7.

[48] Tol (n 12) 426.

[49] WBGU (n 11) 5–7.

[50] Schellnhuber (n 44) 230–231.

[51] WBGU (n 11) 6 fig 1.

The influential role of the WBGU in climate negotiation is widely recognised in many historical studies.[52] However, there are several substantial differences between the EU 2-degree target and the guardrails proposed by the TWA. First of all, the EU target refers 2℃ specifically to the doubling of CO_2 concentration, a common method used in many studies (i.e. the 'forwards mode'), not the historical approach promoted by the WBGU. Secondly, like the EEA Dobris Assessment and the Dutch SLA, only one part of the two TWA guardrails was adopted as the final 2-degree target. The recommendation of controlling the rate of temperature change under 0.2℃ per decade was left behind. Finally, but perhaps most intriguingly, the 1995 WBGU report actually did not mention 2℃. In the report, the WBGU stated that the tolerable maximum temperature increase relative to 1995 should be *1.3℃*.[53] It is only after adding the already occurred warming from preindustrial levels to 1995 (roughly 0.7℃), the figure becomes 2℃ — and this little twist in base years appeared only after the 1996 Council Conclusions, in the 1997 WBGU report and Schellnhuber's article in 2010.[54] Nevertheless, due to a strong advisory position of the WBGU to the government of Germany, it is fair to say that the TWA has also shaped the decision of the EU 2-degree target.

All three interfaces described above have contributed to the final adoption of the 2-degree target. It is of course difficult to tell which one was most influential, but the point here is not about identifying the first person who invented the climate target. The purpose of this research is to examine how different views of risk operate in the process of inter-expert risk communication, and the making of the 2-degree target provides an important case study for analysing the social view of risk.

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[52] Grassel and Metz (n 6); Cointe, Ravon and Guérin (n 9); Randalls (n 9); Jaeger and Jaeger (n 13).

[53] WBGU (n 11) 7.

[54] WBGU (n 45) 13–14; Schellnhuber (n 44).

1.3 ‘Dangerous’ and the social view of risk

The raison d'être of the 2-degree target is to clarify the ultimate objective of Article 2 of the UNFCCC, i.e. to define what constitutes ‘dangerous anthropogenic interference with the climate system’. Defining ‘dangerous’ is a question about risk perceptions and eventually a society’s *acceptability* of risk, a core issue of standard-setting in risk regulation. At what degree will anthropogenic climate change become dangerous? What degree of anthropogenic climate change are we prepared to tolerate? By asking these questions about dangerousness, I argue that experts in the climate case have adopted a social view of risk. This initial social view will gradually develop, as I will demonstrate in later chapters, into a paradigmatic risk conception through inter-expert risk communication.

To recap, the social view of risk is ‘social’ because of the following four features that: 1) evaluate risk through a wide range of scientific methods; 2) consider risk as something special requiring regulatory attention; 3) see risk as inherently uncertain; and 4) link risk with negative consequences. The first point is quite obvious. The climate case incorporated a wide variety of expertise, including natural sciences, engineering, economics and many other social sciences. As discussed earlier in the section, there are many different scientific arguments behind the simple figure of 2℃, some even contradict with each other. Experts have mobilised various epistemologies, in order to try to answer the question of what is dangerous climate change. The logic of the 2-degree target is neither ‘scientific/technical’, nor purely ‘economic’ or ‘political’. It is a pluralist account of expertise, hence ‘social’.

The feature about ‘uncertainty’ is also clearly a key theme of the climate debate. How to present uncertainty in scientific reports for policymakers constantly troubles

scientists in this field. Some reports use a traditional way of expressing uncertainty through percentage and error bars,[55] while others insist that uncertainty in climate science is linked with its complexity and should be presented in an interactive way, so that policymakers can understand the climate as a complex system.[56] Either way, scientific reports and uncertainty have to co-exist. Oppenheimer presents vividly how different types of scientific uncertainty in the case of ice sheet losses are identified and developed in a 'zigzag pattern';[57] the EEA, using a clear diagram (Figure 3.5), illustrates how climate science has evolved over time, adding more complexity and uncertainty to climate models. Experts need to constantly deal with uncertainty, in order to define dangerous climate change. Uncertainty is thus a ubiquitous theme in the climate case and reflects a social view of risk.

An interesting side issue here is that the 2-degree target itself (both the EU and the Copenhagen versions) does not address uncertainty explicitly. Policymakers do not like uncertainty, or to be specific, they do not like uncertainty in a scientific sense. As the then Danish Prime Minister, Lars Løkke Rasmussen, commented in a scientific meeting before the COP 15, for the purpose of negotiation he needs 'fixed targets and certain figures, not too many considerations on uncertainty and risk and things like that.'[58] However, in terms of risk regulations standards, the 2-degree target is in fact pretty uncertain. It is subject to interpretation because there are multiple ways of

[55] For example: WBGU (n 45); EEA, *Europe's Environment: The Dobris Assessment* (n 27); IPCC (n 15). Since its fourth assessment, and further refined in the fifth assessment, the IPCC has developed a standardised treatment of uncertainties and a set of calibrated language to describe 'confidence' and 'likelihood': IPCC, 'Guidance Note for Lead Authors of the IPCC Fifth Assessment Report on Consistent Treatment of Uncertainties' (IPCC 2010).

[56] Interviews with BN (16 August 2013) and ES (2 September 2013); Van Daalen, Thissen and Berk (n 35); Swart and others (n 16).

[57] Michael Oppenheimer, 'Defining Dangerous Anthropogenic Interference: The Role of Science, the Limits of Science: Dangerous Anthropogenic Interference' (2005) 25 Risk Analysis 1399.

[58] University of Copenhagen, 'Climate Congress 2009: Closing Session' (12 March 2009) <http://video.ku.dk/video/8633484/climate-congress-2009-closing-session> accessed 10 June 2015.

measuring 2°C.[59] Public policy about risks has to deal with uncertainty. Therefore, it is not the presence of uncertainty that reflects a social view of risk — uncertainty is always there. What matters is experts' treatment of uncertainty, which will be further explained in Section 2.3 with reference to the euro case.

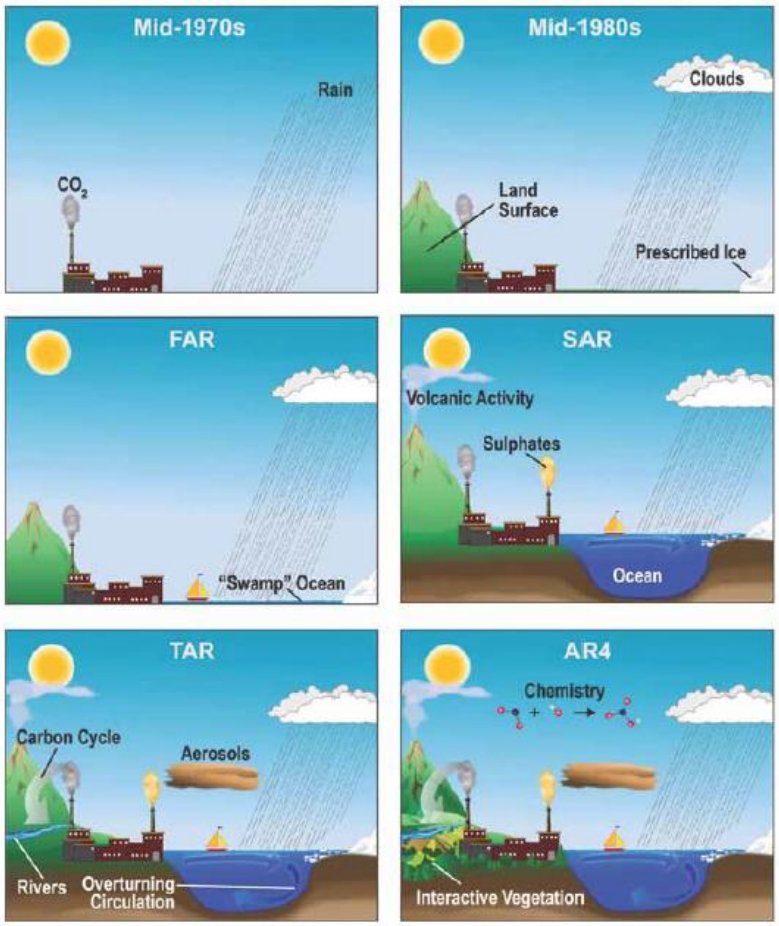

Figure 3.5: Evolution of global climate change models[60]

Finally I want to discuss together the second and fourth features of a social view of risk, i.e. 'normality' and 'impact' of risk. The 2-degree debate mobilised a social view of risk, because experts imagined climate change as something special and hazardous that had to be regulated. This might seem self-evident. After all, people are

[59] Cointe, Ravon and Guérin (n 9).

[60] Grassel and Metz (n 6) 315, fig 14.2. The figure shows that through the advance of climate sciences, the model of climate change becomes gradually more complex.

talking about 'dangerous' climate change. But does climate change always have to be framed as an issue about danger? Arrhenius, who established the use of doubling of CO_2 concentrations as a standardised way of measuring the greenhouse effect, actually viewed 'global warming' as a positive phenomenon that will allow humans to 'enjoy ages with more equable and better climates'.[61] Recently, in particular after the economic crisis, commentators started to consider the 'opportunities' of climate change mitigation as promoting green economies or triggering 'green growth'.[62] Moreover, *anthropogenic* climate change is actually not something external 'out there' to be defeated. It is caused by our own economic developments, a side-effect of industrialisation. We may not necessarily need to adopt a social view of risk in climate debates, and I will discuss this in my final chapter. The point here is that the history of the 2-degree climate target suggests that experts took a social view of risk, at least in the 1990s. They concentrated on combating climate change as a global regulatory objective, and they saw dangerous climate change as, well, something dangerous.

2. The fiscal rules: defining excessive deficit in the Eurozone

'Dangerous' climate change is perhaps yet to come, but the danger of the euro project has already surfaced. With the sovereign debt problems in Greece having escalated into a wider Eurozone crisis, the Economic and Monetary Union (EMU) has come under fire. Studies argue that the main problem of the EMU is that it established a

[61] Svante Arrhenius, *Worlds in the Making: The Evolution of the Universe* (H Borns tr, Harper & Brothers 1908) 63.

[62] Katherine Richardson, Will Steffen and Diana Liverman, *Climate Change: Global Risks, Challenges and Decisions* (CUP 2011) ch 15; United Nations Environmen Programme, 'Global Green New Deal: Policy Brief' (UNEP 2009).

monetary union without being accompanied by a fully-fledged fiscal union.[63] While monetary policies are centralised, Member States still retain full sovereignties in budgetary matters.[64] The proposed solution, though with hindsight not really effective, was setting up a 'macro-coordination of fiscal policies'.[65] The EMU *fiscal rules*, first laid down in the Maastricht Treaty and later on detailed by the Stability and Growth Pact (SGP), are the products of this fiscal coordination strategy.

The fiscal rules, sometimes called the Maastricht criteria or the excessive deficit criteria, require that 'Member States shall avoid excessive government deficits' by complying with two budgetary disciplines: limiting the ration of government deficit to GDP under 3% and the ration of government debt to GDP under 60%.[66] These criteria have thus become the standard of managing the risk of macroeconomic instability in the Eurozone. But why can these two figures, 3% deficit and 60% debt, define the threshold of excessive deficits? Who decided these fiscal rules, and how? I will explain the story in detail, and claim that the benchmark of 'excessive deficits' reflects an economic view of risk in this euro case.

2.1 The thirty years' war of a monetary union

Money can be as sacred as religion. While the Holy Roman Empire failed to forge an 'ever closer union' in Westphalia, the European Community successfully established

[63] David Marsh, *Europe's Deadlock: How the Euro Crisis Could Be Solved - and Why It Won't Happen* (Yale University Press 2013); Harold James, *Making the European Monetary Union* (Belknap Press 2012); Kevin Featherstone, 'The Greek Sovereign Debt Crisis and EMU: A Failing State in a Skewed Regime' (2011) 49 Journal of Common Market Studies 193.

[64] Although recent developments in Greece suggest that the Greek sovereignty on budgetary issues is taken away by Brussels.

[65] Alexandre Lamfalussy, 'Macro-Coordination of Fiscal Policies in Economic and Monetary Union in Europe', *Collection of papers submitted to the Committee for the Study of Economic and Monetary Union* (European Communities 1989) 91.

[66] TFEU art 126 (ex TEC art 104) and Protocol No 12.

the EMU after three decades of struggles. From the 1960s to the early 1990s, different versions of a European monetary union were proposed and tested. The Maastricht Treaty finally sealed the deal of the EMU. No blood was shed in Brussels, but the diplomatic battles were equality intense.

The 1989 Delors Report was the blueprint for the EMU. The report stated clearly that 'effective upper limits on budget deficits of individual member countries' were essential to prevent instability in a monetary union.[67] In fact, this is not just an idea of the Delors Committee — central bankers and national experts at that time generally agreed that building a monetary union would require a certain form of fiscal rules.[68] The 1988 Committee of Governors of Central Banks (CoG) Report of the Alternates mentioned the problem of 'asymmetry' and proposed that a 'greater co-ordination of monetary and economic policies in general and fiscal policies in particular' is one of the preconditions of creating a European central bank.[69] Later in the Monetary Committee (MC), the Alternates also noted the need for the future EMU to coordinate and converge in fiscal policies, but the rules might require 'political will'.[70] Although these reports did not suggest any particular criterion for fiscal coordination, it was already an established point that certain rules in relation to public finance would be necessary for the EMU project.

The asymmetric development between monetary and fiscal integration can be traced back to the classic *monetarist-economists* debate in the 1960s.[71] The

[67] Committee for the Study of Economic and Monetary Union, 'Report on Economic and Monetary Union in the European Community (Delors Report)' (European Communities 1989) 20.

[68] James (n 63) 16–17.

[69] CoG, 'The monetary structure of Europe: working document by the office of the Chairman of the alternates of the Committee of Governors' (Brussels, 24 March 1988).

[70] MC, 'Report on some major implications of government deficits for monetary integration' (10 January 1989) II/17/89-EN.

[71] Ivo Maes, 'On the Origins of the Franco-German EMU Controversies' (NBB 2002) National Bank

'monetarists' prioritised integration in the monetary sphere with the belief that monetary affairs are more technical and less politically sensitive. They believed that monetary integration can 'spill over' and drive the process of European integration. The 'economists', on the other hand, emphasised that monetary and economic integration should go hand in hand. In this sense, a monetary union could only be the last crowning phase of a fully integrated economic union, which is the so-called 'coronation theory'. With France taking the monetarist view and Germany advocating the economist view, this monetarist-economist debate has become mainly a Franco-German battle.[72] As we all know today, the monetarists won the first round, and the economist arguments were transformed into various options related to fiscal coordination that could support further monetary integration.

The development of European integration tilted towards the monetarist side, partly due to actions taken by the European Commission. In 1962, the Commission published a Memorandum on the action programme of the Community for the second stage.[73] This was an ambitious proposal. It not only recognised that 'the economic integration of Europe is in essence a political phenomenon', but also pushed for a full economic and political union.[74] In its chapter on monetary policy, it stated that 'monetary policy is of vital importance to the Common Market'. Moreover, the Memorandum argued that the 'obvious gap' of having a common commercial policy without a common monetary policy in the Rome Treaty should be bridged, and

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of Belgium Working Paper 34; Kenneth Dyson, *The Politics of the Euro-Zone: Stability or Breakdown?* (First Edition, Oxford University Press 2000) 103; Andre Szasz, *The Road to European Monetary Union* (Palgrave Macmillan 1999).

[72] David Marsh, *The Euro: The Battle for the New Global Currency* (Yale University Press 2011); Maes (n 70); Dyson (n 70).

[73] Commission, 'Memorandum of the Commission on the Action Programme of the Community for the Second Stage' (24 October 1962) COM (62) 300 final (1962 Memorandum).

[74] 1962 Memorandum paras 1-6.

proposed that a monetary union could become the objective of the Community in the next stage.[75] Studies suggest that such a strong call for monetary integration was linked with an intention to maintain the common agricultural policy.[76] Although this bold proposal received heavy resistance, the Commission successfully established itself as an actor in the monetary area,[77] which paved the way to the more influential *Barre Plan* in 1969.

Raymond Barre, the Commissioner for the DG II at the time, was a French economist with a German 'economist' approach. Acknowledging the importance of a 'European political authority' and the coronation theory, Barre's proposal for European monetary integration was much more balanced and pragmatic comparing to the 1962 version.[78] The Barre Plan focused on establishing a Community mechanism for monetary cooperation with convergence and coordination of economic policies, which became the basis of the Hague Summit, where the goal of creating an economic and monetary union was adopted by the Heads of State/Government.[79]

The result of the 1969 Hague Summit was the famous *Werner Report*.[80] Headed by Pierre Werner, the then Prime Minister of Luxemburg, the Werner Committee defined for the first time what it meant by an economic and monetary union. On the monetary side, it should be a single currency area with irreversible locking of exchange rates and a Community organisation of central banks; on the economic side,

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[75] 1962 Memorandum paras 130 and 138.

[76] Ivo Maes, 'The Ascent of the European Commission as an Actor in the Monetary Integration Proces in the 1960s' (2006) 53 Scottish Journal of Political Economy 222, 232–233; Szasz (n 70) 8.

[77] Maes (n 75).

[78] ibid 235–236.

[79] Maes (n 75); Szasz (n 70) 11, 15.

[80] Commission, 'Report to the Council and the Commission on the realization by stages of economic and monetary union the Community' (Luxembourg, 8 October 1970) doc 16.956/II/70 (Werner Report)

it means decisions regarding economic policies, in particular budgetary policies, should be taken at the Community level.[81] In other words, the Werner Report presented a highly centralised version of both monetary and fiscal integration, and the report was even explicit with its political implication: '[the EMU] thus appears as leaven for the development of Political Union, which in the long run it will be unable to do without'.[82] It seems that in the second round, the economists have won back some grounds.

The implementation of the Werner Report, however, was another story. The Werner Report recommended that the grand plan of EMU should start with an intensified coordination, which led to the creation of the currency *Snake* in the 1970s and later on the *European Monetary System* (EMS) in the 1980s.[83] Unfortunately, both plans failed to reach their final destination, i.e. an economic and monetary union, and some argue that this was mainly due to the lack of a time table in the Werner Report.[84] Building on these failed experiences and the new political momentum gained after the Single European Act, the Delors Committee in 1989 revived the EMU project — this time with a clear time table and a less centralised fiscal coordination strategy. The monetarists won again in the battle.

There are many studies that focus on the reason why the Delors Report realised the EMU while the Werner Report failed. This is not the main concern of my research. The point here is to show that the monetarist-economist debate was deeply entrenched in the whole EMU project, and it has a significant bearing on the making of the fiscal

[81] Werner Report (n 80) 9-14; James (n 63) 74–85; Szasz (n 70) 30–35.

[82] Szasz (n 70) 33.

[83] For more details about these two projects: James (n 63) ch 4 and 5; Szasz (n 70) ch 5 and 7; Tommaso Padoa-Schioppa, *The Road to Monetary Union in Europe: The Emperor, the Kings, and the Genies* (2nd Revised edition, OUP Oxford 2000) ch 3.

[84] James (n 63) 77, 83; Szasz (n 70) 34–35. In Chapter 5 I will talk more about the importance of time table and a 'make-it-work' mentality in relation to the discussion of the EMU fiscal rules.

rules. The rationale of the fiscal rules was thus deeply entangled with the politics of European integration. One original contribution of this euro case is that I provide a detailed narrative of the development of the EMU fiscal rules. Although monetary integration belongs to the high politics of the EU, the EMU project should not be simplified as a 'political project'.[85] There are indeed, as monetarists argued, many technical and economic aspects behind the politics of the euro, and the negotiation of the fiscal rules in the Monetary Committee is a good example to demonstrate this complicated process of inter-expert risk communication.

2.2 The Monetary Committee and the Commission as core actors

Many studies confirm the important role of the Monetary Committee (MC) in shaping the EMU project. The MC played an 'intermediary role' between the Commission and the Council — in practice, the Commission respects the consensus of the MC before making its proposal, whereas the Council normally confirms the outcomes adopted in the MC (Figure 3.6). Its former Secretariat, Andreas Kees, recalled: 'No important monetary decision in Community history has been taken without preparatory work by the [Monetary] Committee'.[86] The MC is therefore not just a supporting body, but has de facto power of decision-making in monetary affairs.

[85] James (n 63) 1–2. James' historical analysis seeks to provide a more contextualised account of the EMU's 'flaws in the institutional framework' (ibid 16-20), contrary to the common critique that sees the euro project as 'political' or even a plot of conspiracy, like the view presented in Bernard Connolly, *The Rotten Heart of Europe* (Faber & Faber 2013).

[86] Andreas Kees, 'The Monetary Committee of the European Community' (1987) 20 Kredit und Kapital 258, 260.

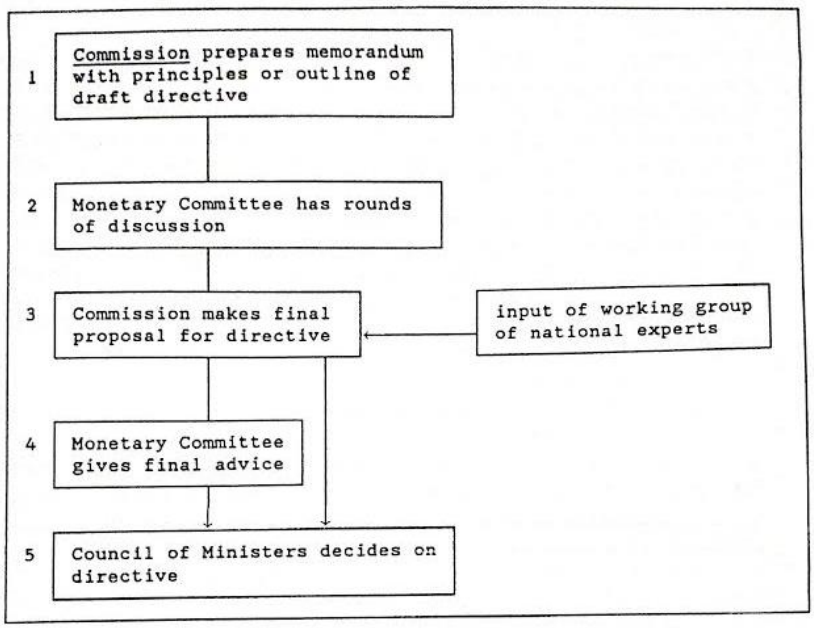

Figure 3.6: Preparation of Directives on monetary affairs[87]

The composition of the MC created its unique position in the decision-making process. Each Member State can appoint two full members, one from the ministry of finance/economics and the other from the national central bank. These members can then each appoint one alternate. The Commission can also send two officials to the MC. This created 'a unique blend of expertise' between central bankers and high-ranking government officials.[88] With good links to both national governments and the Commission, they were 'technical experts who were exceptionally well placed to know what was politically feasible.'[89] Moreover, the MC provided a special organisational environment for negotiating monetary affairs. Meetings were secretive, which guaranteed frank and honest discussions among members. Decisions were taken mostly by consensus, which promoted compromise and policymaking. In

[87] Age FP Bakker and others (eds), *Monetary Stability through International Cooperation: Essays in Honour of André Szász* (1994th edn, Springer 1994) 63, fig 7.

[88] ibid 65.

[89] Amy Verdun, 'Governing by Committee: The Case of Monetary Policy' (EU Center of California Working Paper 1999) 5.

addition, there was a significant continuity of memberships, which facilitated trust among members.[90]

Several studies suggest that the detail of the fiscal rules, in particular the reference values, were decided in the MC.[91] My own empirical data confirm this claim. Before the Delors Report, the MC has already noted that further integration in the monetary area would require coordination of fiscal policy.[92] Later on it has become one of the main tasks of the MC to operationalise the so-called 'effective upper limits on budget deficits' stipulated in the Delors Report. By putting the concept of fiscal coordination under the economic leg of the EMU, early discussion in the MC have centred on the argument of *parallelism* (a revival of the earlier economist school, arguing that the economic leg should be fully developed before further monetary integration)[93] and on the conditions for the EMU to progress 'beyond stage 1'.[94] After many contributions from the alternate members of the MC on budgetary disciplines, it became clear that a full monetary union would require certain forms of budgetary constraints, although the exact content of such constraints was still unclear and contested.[95] It was against this backdrop that the MC coined the concept of

[90] ibid; Bakker and others (n 86) 66.

[91] Padoa-Schioppa (n 82); Jan Viebig, *Der Vertrag von Maastricht: Die Positionen Deutschlands Und Frankreichs Zur Europäischen Wirtschafts- Und Währungsunion* (Schäffer-Poeschel 1999) 355–364.

[92] MC, 'Some tasks for 1989 – Note from the Chairman' (II/35/89, 23 January 1989); MC, 'Report by the Chairman of the Alternates on some issues raised by the French Memorandum of January 1988 on the monetary construction of Europe' (27 February 1989) II/82/89-EN, 3-4.

[93] MC, 'The Chairman's report to ministers on the Monetary Committee's first discussion of the Delors Committee's report' (17 May 1989) II/02847, 3-4 and 6-7.

[94] MC, 'Economic and monetary union beyond stage 1 – Introductory note from the Chairman in preparation for the discussion on 20 October' (18 October 1989) II/06056; Commission, 'Short minutes of the meeting of the Monetary Committee (Lisbon, 20th October 1989)' (25 October 1989) II/06239.

[95] MC, 'Note for the attention of the alternate members of the Monetary Committee' (17 November 1989) II/06738, annexes II/393/89 (reports submitted by the Belgian, Danish, German, French and British alternates) and document 891113/DGII/09837 (note by the Italian alternates).

excessive deficits in early 1990,[96] which led eventually to the adoption of the Excessive Deficit Procedure (EDP) in the Maastricht Treaty.

While many claim that the MC was a critical actor and a central forum for the EMU debate,[97] my data from the Historical Archives of the Commission suggest that the role of the Commission was equally influential, and perhaps even more important than the MC, at least in the case of shaping the EMU fiscal rules. The Commission, already in summer 1989, had quite a clear picture about fiscal coordination in the EMU. In a paper entitled 'budgetary policies and their effect', the Commission compared different possible regimes of fiscal coordination, by analysing them through major economic schools of thought.[98] The paper concluded that a mutual surveillance scheme accompanied by deficits and/or debts ceilings would be the most suitable arrangement of fiscal coordination for the Community.[99] This conclusion had thus guided the work of the Commission, and later on the discussion in the MC, to focus on designing a two-tier system of budgetary discipline, with general principles in the Treaty and specific guidelines in lower level legislation.

Although there was a general consensus that excessive deficits should be avoided in the EMU, members of the MC found the task of defining 'excessiveness' extremely challenging. In a draft report in March 1990, the Monetary Committee argued that '[it] is *not possible* to lay down an upper limit for acceptable deficits, for instance in terms of GDP, which will be universally valid.'[100] This position was softened in the formal

[96] MC, 'Budgetary discipline: suggested themes for the first of the discussion under item 5 of the agenda for 22 January' (10 January 1990) II/17/90-EN.

[97] Verdun (n 88); Bakker and others (n 86); Kees (n 85).

[98] Commission, 'Budgetary policies and their effect: how and why schools of thought differ' in *Economic and Monetary Union Background Papers* (Brussels, 2 August 1989) II/04594, paper no 4 (Commission 'schools of thought' paper).

[99] Commission 'schools of thought' paper (n 98) 11-12.

[100] MC, 'Economic and Monetary Union beyond stage 1 – Orientations for the preparation of the

version, by claiming that such upper limit 'would prove extremely difficult' to find.[101] The issue of defining excessive deficits somewhat stagnated throughout the year 1990, until the alternate members were asked again to develop some concrete criteria for assessing excessiveness. The alternates and the Commission submitted many papers for the discussion in the alternates' meeting in November 1990. The Commission's proposal combined the so-called 'Golden rule of public finance' (government net borrowing should not exceed its capital expenditure) with the 'sustainability of public debt' criterion, and argued that a country's debt could be considered sustainable, if its public debt/GDP ratio is not greater than a common reference level, for example the Community average.[102] This two-criterion proposal (Golden rule + debt/GDP ratio) was supported by many in the meeting, although the idea of using the Community average as the reference value was contested.[103]

A clearer picture emerged after follow-up discussions in the main MC meeting in early 1991. The MC's report entitled 'criteria for excessive deficits' proposed two criteria — the *unsustainability criterion* (debt/GDP ratio) and the *economic instability criterion* (Golden rule + deficit/GDP ratio), and noted that Community averages were suggested by some members as reference values.[104] In order to specify these criteria, in particular their reference values, there was a series of discussions back and forth between the main MC and the alternates, sometimes noted as 'chaotic' or 'confusing'

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intergovernmental conference' (Brussels, 26 March 1990) para 8.

[101] MC, 'Report by the Monetary Committee: Economic and Monetary Union beyond Stage 1', in 'Work on excessive deficits' (Brussels, 19 October 1990) annex 1, para 8.

[102] Commission, 'Criteria for excessive deficits in Economic and Monetary Union' (13 November 1990) 3-6.

[103] CoG, 'Criteria for Excessive Public Sector Deficits in Stage Three of EMU (Monetary Committee Alternates Meeting 15th November)' (note by Jenkinson, 20 November 1990) 5-8.

[104] MC, 'Criteria for Excessive Deficits' (25 February 1991) II/476/90-EN/Rev.2, 4-7.

in the minutes of meetings.[105] Again, the Commission led this rather disorderly debate, by offering a key report with empirical evidence on 'real world examples'.[106] This paper used historical data from the 1980s to 'simulate' how Member States would have performed under different proposed criteria of budgetary disciplines. Unsurprisingly, the paper used the average debt level of the Community at the time, 60%, as the reference value for the unsustainability criterion. In addition, the paper also tested the situation of using a deficit/GDP criterion (with a reference value of 5%, close to 4%, the Community average at the time) without the Golden rule. By using a systematic method with historical evidence, the Commission's paper received positive feedback in the MC and the alternates found the results 'illuminating'.[107] The table below (Figure 3.7) is an example of these results.

[105] Commission, 'Short minutes of Monetary Committee 13 March 1991' (15 March 1991) II/01624; CoG, 'Fishing for Budgetary Discipline (Excessive Budget Deficits and Sanctions in EMU)' (note by Jenkinson, 25 March 1991).

[106] Commission, 'Criteria for excessive deficits: applications to real world examples' (Brussels, 7 February 1991) II/56/91-EN (Commission 'real world examples' paper).

[107] MC, 'Report by the Chairman of the Alternates on Their Further Work on the Excessive Deficit Procedure' (Brussels, 7 March 1991) II/115/91-EN, 1.

Excessive deficit?	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
B Unsustainability		yes	yes	yes	yes	no	yes	no	no	no	yes	no
Deficit level	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
DK Unsustainability		yes	yes	no	no	no	no	yes	no	no	no	no
Deficit level	yes	yes	yes	no	no	no	no	no	no	no	no	no
D Unsustainability		no	no	no	no	no	no	no	no	no	no	no
Deficit level	no	no	no	no	no	no	no	no	no	no	no	no
GR Unsustainability		no	no	no	yes	yes	yes	yes	yes	yes	yes	yes
Deficit level	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
E Unsustainability		no	no	no	no	no	no	no	no	no	no	no
Deficit level	no	yes	no	yes	yes	yes	no	no	no	no	no	no
F Unsustainability		no	no	no	no	no	no	no	no	no	no	no
Deficit level	no	no	no	no	no	no	no	no	no	no	no	no
IRL Unsustainability		yes	yes	yes	no	yes	no	no	no	no	no	no
Deficit level	yes	yes	yes	yes	yes	yes	yes	yes	no	no	no	no
I Unsustainability		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Deficit level	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
L Unsustainability		no	no	no	no	no	no	no	no	no	no	no
Deficit level	no	no	no	no	no	no	no	no	no	no	no	no
NL Unsustainability		no	yes	yes	yes	no	yes	yes	no	yes	no	no
Deficit level	yes	yes	yes	yes	no	yes	yes	yes	yes	yes	no	no
P Unsustainability		no	no	yes	yes	no	yes	yes	no	no	no	no
Deficit level	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	yes	no
UK Unsustainability		no	no	yes	no	no	no	no	no	no	no	no
Deficit level	no	no	no	no	no	no	no	no	no	no	no	no
EC Unsustainability		no	no	no	no	no	no	no	no	no	no	no
Deficit level	yes	yes	yes	yes	yes	no	no	no	no	no	no	no

Unsustainability

yes : Debt-GDP ratio above 60%, rising without stabilization effort
no : Debt-GDP ratio below 60%, or declining, or rising with stabilization effort

The debt-GDP ratio is supposed to be "rising with stabilization effort" if the change in government net lending excluding interest payments (primary balance) is at least 50% of the change required for immediate stabilization. The level of primary balance required for immediate stabilization has been calculated by taking 3% of the debt-GDP ratio.

Definitions used : - general government
- gross public debt
- primary balance corrected for stock-flow adjustment (debt definition)

Deficit level

yes : government net borrowing larger than 5% of GDP
no : government net borrowing not larger than 5% of GDP

Definitions used: - general government

Figure 3.7: Commission's real world examples[108]

The significance of the Commission paper on real world examples was not only that it successfully advocated the use of Community averages in the criteria, but also because it changed the way how members of the MC discussed excessive deficits. Before the Commission paper, members were debating about excessiveness in an

[108] Commission 'real world examples' paper (n 106) 13-14, table 6 and its legend.

abstract and theoretical sense. However, after seeing the real world examples of the paper, members were able to associate the degree of excessiveness with concrete outcomes. It became clear to experts which countries would have been 'caught' by breaching the proposed criteria. This contributed to the interesting 'fish-catching' metaphor used in several MC meetings: excessive deficit criteria were described as 'net', and the discussion of excessiveness was about the finesse of the 'mesh', in order to decide whether the net should catch 'fish of different sizes' or catch 'big fish only'.[109] To follow this metaphor, the Commission paper on real world examples had helped members of the MC to switch their focus from the net (the degree of excessiveness) to the fish (who would have been caught). Towards the end of this discussion on excessive deficits criteria, the debate was mainly focusing on catching certain Member States (mainly Italy at the time), rather than the economic rationale of the proposed criteria.[110]

Finally in June 1991, the 60% debt/GDP criterion was accepted 'grudgingly' by members of the MC;[111] and before the eve of the Maastricht Summit, a 3% deficit/GDP criterion without the Golden rule was suggested.[112] These figures were very close to the proposal of the Commission. In addition, the MC agreed that the Excessive Deficit Procedure (EDP) should be laid down in the Treaty, with the specific reference values noted in a protocol.[113] This was also quite similar to the

[109] CoG, 'Fishing for Budgetary Discipline', 25 March 1991 (n 105); MC, 'Report by the Alternates on the Excessive-Deficit Procedure' (Brussels, 12 April 1991) II/167/91.

[110] Commission, 'Short minutes of Monetary Committee 13 March 1991' (15 March 1991) II/01624; Commission, 'Minutes of Monetary Committee, 16/17 April 1991' (22 April 1991) II/02302.

[111] Commission, 'Minutes of Monetary Committee, Brussels 17 June 1991' (24 June 1991) II/03527, 8.

[112] MC, 'Outstanding issues on the excessive-deficit procedure' (Brussels, 20 September 1991) MC/II/419/91; Commission, 'Short minutes of Monetary Committee, 30 September 1991' (4 October 1991) II/05112, 5-6.

[113] Commission, 'Short minutes of Monetary Committee, 30 September 1991' (4 October 1991) II/05112.

Commission's position of establishing a two-tier surveillance scheme. Apparently, messages from the Commission were transmitted successfully to the MC and eventually to the Intergovernmental Conference (IGC) on the monetary union, while contributions from many other alternate members of the MC were not taken into account in the debate. I will discuss more about this process of amplifying and/or attenuating messages in Chapter 6. To focus on the story of the EMU fiscal rules, it can be summarised that the EDP was promoted by the Commission, hatched in the MC and adopted in the IGC.

Therefore, although the MC was the major forum of the EDP debate, the Commission was perhaps most influential in terms of the substance of the fiscal rules. The logic behind the current 3%/60% fiscal rules was simple: 60% debt/GDP was the average debt level of the Community in 1990, and 3% deficit/GDP would be compatible to 60% debt, provided that there is an annual growth of 5% (achieved by 3% real growth and 2% inflation).[114] This rationale, although often criticised as arbitrary, did rely on economic analysis, and as I will argue in the next section, further strengthened an economic view of risk.

2.3 'Excessive deficits' and the economic view of risk

As mentioned above, members of the MC coined the notion of excessive deficits for discussing the fiscal rules, yet struggled with the precise definition of excessiveness. Searching for excessive deficit criteria is an activity similar to defining dangerous climate change in the climate case. They both aim to determine an acceptable level of

[114] Willem Buiter and others, 'Excessive Deficits: Sense and Nonsense in the Treaty of Maastricht' [1993] Economic Policy 58, 62–63; Viebig (n 91) 356–359; Daniel Gros and Niels Thygesen, *European Monetary Integration: From the European Monetary System to Economic and Monetary Union* (2nd edn, Longman 1998) 333–341.

risk. However, I argue that most actors involved in the euro case took an economic view of risk, which then developed into a specific risk conception through the process of risk communication. This economic view, as introduced in Chapter 1 and 2, is particularly 'economic' based on the following features: 1) it uses mainly economic expertise to evaluate risk; 2) it considers risk as part of the normal routine of a bigger project; 3) risk is by definition calculable and manageable; and 4) risk is often associated with positive meanings.

The first feature is quite clear. Members of the MC were high-ranking officials or central bankers, who all received extensive training in economics and particularly in public finance. Senior officials in the DG II were also often highly specialised in the field of economics and finance. Moreover, many contributions of the MC alternates were technically quite heavy and relied on various economic tools; reports of the Commission, likewise, utilised economic theories (the 'schools of thought' paper[115]), cost-benefit analysis (the 'one market, one money' paper[116]) and macroeconomic data (the 'real world examples' paper[117]). Applying economic expertise in relation to public policy related to risk is the first step towards adopting an economic view of risk.

Secondly, risk was considered measurable in the euro case. A lot of discussion about the fiscal rules focused on calculating and estimating the effectiveness of the rules. The Commission's paper on real world examples is again a good illustration of this practice. However, this does not mean that experts in the euro case did not find any uncertainty or complexity in defining excessive deficits. On the contrary, as much

[115] Commission 'schools of thought' paper (n 98).

[116] Commission, 'One market, one money: an evaluation of the potential benefits and costs of forming an economic and monetary union' (October 1990) 44 European Economy.

[117] Commission 'real world examples' paper (n 106).

historical data presented in the previous subsections suggests, they were well aware that such an exercise was difficult and complex. What makes the euro case different from the climate case is that economic experts *believe* that excessive deficits could be correctly identified. The reason why they disagree with each other is not because excessive deficits are fundamentally uncertain, but because they have strong faith in their own approaches, be it based on simple criteria, complex economic tools or national-specific considerations. Unlike economists, experts involved in the climate case constantly emphasise the limits of sciences. They stress that the identification of dangerous climate change is value-laden and can only be decided politically.[118] The discussion of the euro case, by taking an economic view of risk, considers excessive deficits eventually measurable. The question is therefore not whether the risk is calculable or not, but *how* to calculate the risk.

An interesting issue related to economic expertise and calculability of risk is the debate between *automaticity* and *judgement*, i.e. whether the fiscal rules should be automatically enforced or whether the enforcement should be based on judgement. This was a theme constantly featured throughout the whole EMU debate. Eventually, experts agreed that a certain degree of judgement is unavoidable, but quantitative rules were still required for the EDP.[119] This automaticity/judgement debate is somehow similar to the distinction between scientific objectivity and value-laden judgements in the climate case.[120] Their common denominator is a more fundamental philosophical question about objectivity and subjectivity, or in Rosa's terms, different versions of ontological theory of risk: is 'risk' something that exists in the world that

[118] Interviews with CM (2 April 2014), BK (5 September 2013) and SK (6 September 2013); see also Oppenheimer (n 57); Metz (n 7).

[119] Commission, 'Minutes of Monetary Committee, 16/17 April 1991' (22 April 1991) II/02302.

[120] Metz (n 7) ch 3; Oppenheimer (n 57).

can be objectively observed (realism/objectivism); or is it subjected to perceptions, (re-)interpretations and contextualised understanding (antirealism/constructivism)?[121] Again, the nuance lies in the attitudes of the experts: in the climate case, experts stress the limit of objectivity and see risk as scientifically uncertain, whereas in the euro case, experts rely on the power of objectivity and consider risk as calculable through economic methods.

The last two features of the economic view, seeing excessive deficits as side-effects of the EMU and the positive connotation of the fiscal rules, are inextricably linked. The debate about fiscal rules stood firmly against the backdrop of the EMU project, and was presented as an opportunity of further European integration. This was a well-developed logic of the monetarists: monetary integration, which is more 'technical', could advance first and promote integration in other sectors through its spill over effects. After the monetarists formally won the battle in the Delors Report, the economists followed suit: fiscal coordination is essential, to safe-guard economic stability and realise the EMU project. Excessive deficits, through these framings, are considered as 'side-effects' of a common currency as well as part of the normal process of European integration. Its regulation is to serve a greater good, not to control excessive deficits *per se*. The EMU project was, as Harold James noted in his historical analysis, an 'innovative, daring, and risk-filled experiment'.[122] Be it risk-taking or risk averse, these different ways of conceptualising risks in the two case studies are shaped by the wider historical contexts that the two risk regulation standards were embedded in.

[121] Eugene A Rosa, 'Metatheoretical Foundations for Post-Normal Risk' (1998) 1 Journal of Risk Research 15, 18–19.

[122] James (n 63) 1.

3. History and risk communication: junctures, trajectories and legacies

After introducing the histories of two risk regulation standards, it is now sensible to further examine how historical events influence the process of risk communication among experts. History is not just a background to my case studies. It shapes risk communication activities, and thus contributes to the development of two diverging views of risk. Therefore, it is important to look at the relations between history and risk communication, and the discussion here in this section will facilitate my analyses throughout this thesis.

As my analysis is partly based on historical institutionalism, two concepts are particularly relevant to this chapter — critical juncture and path dependence. The critical juncture argument emphasises the power of crucial historical moments on the formation of institutions, whereas the claim of path dependence explains why institutions tend to be continuous, self-reinforcing and following the 'path' of existing structures.[123] In other words, the former focuses on short-term exogenous shocks, while the latter examines long-tern evolution of institutions. Roughly following this classification, I categorise historical events into three groups: junctures, trajectories and legacies.

Historical junctures are short-term events. In the context of my two case studies, a key example of a short-term juncture is German reunification, but my analysis also includes the accession of other new EU Member States. Trajectories and legacies are both long-term trends. To clarify, *historical trajectories* are those trends that evolve *together* with the process of risk communication, and *historical legacies* are those that

[123] Kathleen Thelen, 'Historical Institutionalism in Comparative Politics' (1999) 2 Annual Review of Political Science 369, 387–388.

developed *before* major risk communication activities take place. In my two cases, they both shared a common trajectory of globalisation, but relied on different legacies of early European integration projects.[124] The following section will discuss these three categories (juncture, trajectories and legacies) separately and explain why the influences of historical events on risk communication are important to the institutional analysis of my research.

3.1 German reunification as a critical juncture

The fall of the Berlin Wall marked the end of the Cold War and led to a whole new phase of European integration. The discussion of the EMU fiscal rules, as part of the Maastricht Treaty, was obviously entangled with this post-Cold War integration history. Many historical studies have shown how various political and economic incidences of European integration have contributed to the evolution of the EMU.[125] These studies also suggest that the reunification of Germany, causing a strong sense of insecurity internally within the European Community, was an important historical event related to the making of the EMU.[126]

Risk communication about the EMU fiscal rules was clearly influenced by European integration in general and German reunification in particular. This can be supported by my examination of meeting minutes and papers from the archives of the Commission. The Monetary Committee (MC), as the primary forum in the whole EMU debate, started its meetings every time with an 'exchange of views on exchange

[124] It is of course not always easy to draw a clear distinction in terms of temporal sequence, and the discussion here should not be read as 'globalisation' was not important 'before' the discussion of the two risk regulatory standards, nor the two 'early projects' ceased to be influential 'during' the debate.

[125] For example Marsh (n 71); Padoa-Schioppa (n 82); Szasz (n 70).

[126] Marsh (n 71) ch 5; Padoa-Schioppa (n 82) 166, 185–186; Szasz (n 70) ch 15.

and interest rate developments', in which the discussion covered mostly monetary and financial relations internally within the Community and externally with other economies. The situation in Germany, in particular the development of 'German economic and monetary union' (GMU) during the reunification process, was intensively discussed and linked with issues such as surveillance and convergence for the preparation of the EMU.[127]

The above mentioned literature and archival records show that experts discussed difficulties of future EMU against the background of critical political incidences, and put risk communication into the context of post-Cold War politics. Moreover, as my interviews suggest, the historical background and communication of risk were not simply *parallel* discussions in the same meetings, but *integrated* debates about the future of the EMU:

> [The reunification of Germany] triggered a lot of instability, because the Deutsche Mark had been the anchor [currency]. So it made it even more *necessary* to move to the EMU to protect us against that instability, […] because the [German] unification is *a good example*.[128]

The notions of 'necessity' and 'good example' are intriguing. They seem to suggest that the (successful) story of monetary and economic integration between the two German states has made the case for the EMU project. With the precedent of the GMU, monetary integration at the EU level has become more plausible. Moreover, because of the status of Deutsche Mark as the anchor currency of the European Exchange Rate Mechanism (ERM), it was almost unthinkable to separate these two

[127] A smooth economic integration of the two German states was considered essential for the wider monetary integration in Europe to progress. As Trichet stressed, GMU will have implications for Deutsche Mark being the EMS anchor, so 'it was important for everyone that GMU should be managed successfully, and there was no conflict on this between Germany and its partners' (Commission, 'Minutes of Meeting of the Monetary Committee 24/4/90' (27 April 1990) II/02556, 6). There were several other minutes noting the importance of GMU experience in the EMU project, e.g. Commission, 'Short Minutes Monetary Committee of 18 December 1990' (21 December 1990) II/07563; Commission, 'Minutes of Monetary Committee, Brussels 17 June 1991' (24 June 1991) II/03527.

[128] Interview with CS (27 Jun 2013).

issues. In this sense, with a reunified Germany, monetary integration at the EU level has become more compelling. As one economist who participated in the process as an external expert commented, German unification has 'accelerated the EMU process of negotiating the Maastricht Treaty', because other Member States were 'fearful about Germany and also ready to make some concessions'.[129]

Therefore, the issue of economic stability, the importance of the Deutsche Mark, the example of the German reunification process and the power of a unified Germany were all part of an integrated discussion about the future of the EMU. They are 'integrated' because it seems nearly impossible to separate these issues in the EMU debate — Germany was and still is the centre of the Eurozone.[130] This is of course not surprising and hardly something new,[131] but my point here, linking with the critical juncture argument, is that German reunification has created a huge momentum and *catalysed* the process of risk communication. A counterfactual thinking might suggest that even if the Berlin Wall did not fall in 1989, the Maastricht Treaty would probably still have been signed at some point in the early 1990s.[132] A unified Germany may not be the premise of European monetary integration, but certainly the reunification process has intensified the discussion about the (in)stability of the EMU.

While the link between German reunification and the discussion of fiscal rules seems obvious, exactly what aspect of this same crucial historical moment contributed to the communication about climate risks? Rather surprisingly, my findings suggest

[129] Interview with MT (27 Aug 2013).

[130] Ulrich Beck and Rodney Livingstone, *German Europe* (1 edition, Polity 2013); Marsh (n 71).

[131] Many studies have discussed about the German influences to the euro project today and in the past. For example Marsh (n 71) ch 3; Padoa-Schioppa (n 82); Matthew Lynn, *Bust: Greece, the Euro and the Sovereign Debt Crisis* (1 edition, Bloomberg Press 2010).

[132] The Delors Report has laid the blueprint and the basic timeline of the EMU in early 1989. However, my main focus here is the impact of German reunification on risk communication. The potential causality between the reunification of Germany and the creation of EMU is interesting, but I will leave that to other researchers.

that a unified Germany has also played a key role in the EU climate debate. As introduced in Section 2, one major contributor to the 2-degree climate target was the German Advisory Council on Global Change (WBGU). According to Schellnhuber, then Vice-Chair of the WBGU, the 'Tolerable Window Approach' was the original concept that led to the 2-degree target, and was channelled through a direct communication between WBGU and the then environment minister Angela Merkel, due to the fact that Merkel has a science background and was thus able to understand the original research of the WBGU.[133] A senior German scientist recalled:

> Without the reunification, a theoretical physicist would have never made it to the top. (*laugh*) But that's very true! We had several Minister-Presidents in the Länder with a scientific background, through this *reshuffling* (of reunification). […] If you have a well-established political elite circle, a figure like Angela Merkel would not make it. Because everything was upside down at the end of German reunification, people with knowledge merit, without networks, were able to make it, and [Merkel] has become a very defining figure out of post-reunified Germany.[134]

It would never be clear, in terms of history of science, whether the WBGU-Merkel story was the main factor that shaped the adoption of the 2-degree target, but it is plausible that it had some bearing. This anecdote shows how historical incidences can have unpredictable impacts on the course of risk communication, which is also the view of Schellnhuber, who personally conveyed the message to Merkel in the mid-1990s.[135] In fact, as I will explain later in Chapter 4, the network among experts in the climate case contains a significant 'gap' between scientific communities and the policymakers. It is perhaps due to this particular structure, that historical incidences become particularly consequential in the process of risk communication and start to 'bridge' the gap.

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[133] Schellnhuber (n 44).

[134] Interview with KT (30 September 2013).

[135] Schellnhuber (n 44) 230.

Another non-German scientist who participated in the EU and IPCC climate discussions observed, in a more neutral way, how German reunification, together with the rise of the Green Party in Germany, influenced EU climate policy debate:

> Environmental activism was certainly quite strong [in Germany]. Plus the whole issue of German unification, there was a lot of funding been injected into research organisations and universities, particularly in the East, and a lot of new organisations were springing up. That was the time when the Potsdam Institute [for Climate Impact Research (PIK)] was founded.[136]

This shows how historical background has a bearing on risk communication in a more sophisticated way. It may be true that the PIK (where Schellnhuber was the Director) had significantly contributed to the creation of the 2-degree target and Germany was at the centre of the whole climate debate.[137] However, the above comment suggests that the influence of historical events on the practice of risk communication may be quite complex. Due to political coincidences, a unified Germany provided a rather surprising channel to directly bridge the gap between science and public policymaking, but perhaps it was the expansion of the scientific community as a whole after the Cold War that fundamentally *accelerated* the process of risk communication in the area of climate change.

There are some further examples of critical junctures. In addition to integrating Eastern Germany into the EU, other 'normal' enlargements also contributed to the changing landscape of EU climate debate. Several experts shared their observations that the 2-degree climate debate was significantly shaped by the accession of new EU Member States in 1995, namely Austria, Sweden and Finland. On the one hand, these new members were able to benefit from the pre-existing debate and update their

[136] Interview with TD (4 September 2013).

[137] On the latter point, Christian Hey, 'The German Paradox: Climate Leader and Green Car Laggard' in Sebastian Oberthür and Marc Pallemaerts (eds), *The New Climate Policies of the European Union: Internal Legislation and Climate Diplomacy* (VUB Press 2010) 211.

national climate policy fairly quickly; on the other hand, they became part of the core of EU internal climate discussions and further enhanced the EU's external position.[138] The two new Nordic countries had clear and strong interests in promoting climate change mitigation and stringent emission reduction goals, because of their own extreme climate conditions.[139] As for Austria, a senior civil servant commented that 'there was a kind of secret club between Austria, Germany, Denmark and the Netherlands. Because we had set (reduction) targets and we wanted to push for those. We tried to coordinate.'[140] For her, the synergies within 'the four-group' were strong both at civil servant as well as minister levels.[141] The 1995 enlargement coincided with the first Conference of the Parties (COP) of the UNFCCC in Berlin, and as research suggests, the 'rich and green' countries, including Austria, Denmark, Finland, Germany, the Netherlands and Sweden, had successfully promoted ambitious targets at the EU level.[142] Again, although one may argue that these enlargements (East Germany and the three new 'rich and green' countries) only contributed partly to the adoption of the 2-degree targets, they have clearly *intensified* the communication about climate risks.[143]

To summarise, I argue that crucial historical junctures such as the reunification of Germany have shaped activities of risk communication in both cases, mainly through accelerating and intensifying the risk communication process. Hence, my analysis

[138] Interviews with JP (6 September 2013), QH (6 September 2013) and KA (26 August 2013).

[139] Interviews with JP (6 September 2013) and QH (6 September 2013).

[140] Interview with KA (26 August 2013).

[141] Ibid.

[142] Lasse Ringius, 'The European Community and Climate Protection: What's behind the "Empty Rhetoric"?' (CICERO 1999) 17–22.

[143] It should be noted here that the 1995 enlargement did not create a similar impact in the euro case, because the negotiation of the EMU fiscal rules has been largely completed in 1992.

suggests that *critical junctures can be catalysts of risk communication*. However, the mechanisms of catalysis differ slightly in the two cases: in the climate case, risk communication was accelerated mainly by including more experts specialised in climate sciences; in the euro case, catalysis occurred by strengthening the political will for a single currency. This seems to suggest that a single critical event (German reunification) can lead to similar impacts through rather different 'pathways' due to different institutional structures.[144] Such subtle difference has to be further analysed from a broader perspective, by looking at long-term historical developments.

3.2 Globalisation as a common trajectory

After the Cold War, globalisation was accelerated, and this had a bearing not only on European integration, but also on the process of risk communication at the EU level. As a global issue, it makes much sense to start the discussion here with the climate case. Climate change only became an important international political issue after the foundation of the Intergovernmental Panel on Climate Change (IPCC) in 1988. The 1990s have witnessed a relatively rapid development of international climate change policy (compared to the stagnation after 2000s), with the conclusions of the UNFCCC and the Kyoto Protocol as key achievements.

The EU was clearly leading global climate change negotiation.[145] It decided to take up a leadership role in environmental policy very early on, by a Declaration of the European Council in 1990:

As Heads of State and Government of the European Community, we

[144] This will be discussed in Chapter 4 on 'networks'.

[145] Sebastian Oberthur and Marc Pallemaerts (eds), *The New Climate Policies of the European Union: Internal Legislation and Climate Diplomacy* (VUB Press 2010); Marjan Peeters and Kurt Deketelaere, *EU Climate Change Policy: The Challenge of New Regulatory Initiatives* (Edward Elgar Publishing 2006).

> recognise our special responsibility for the environment both to our own citizens and to the wider world. We undertake to intensify our efforts to protect and enhance the natural environment of the Community itself and the world of which it is part. We intend that action by the Community and its Member States will be developed on a coordinated basis and on the principles of sustainable development and preventive and precautionary action.[146]

The European leaders clearly adopted a strong position in relation to the environment both within and beyond the Community. This Declaration on the 'environmental imperative' further stressed that, 'as one of the foremost regional groupings in the world', the Community had a wider responsibility to 'play a leading role in promoting concerted and effective action at global level'.[147] Therefore it established a normative link between European integration and the EU's global leadership in relation to environmental issues. As the 'spillover' thesis of regional integration theory suggests, there is an 'externalisation' of European integration,[148] i.e. the internal integration among Member States has called for and enhanced by a common position of the EU externally to the world. 'The internal and external dimensions of Community environment policy are therefore inextricably linked'.[149]

The European Council further defined this leadership in particular in the field of climate change policy:

> The Community and its Member States have a special responsibility to encourage and participate in international action to combat global environmental problems. Their capacity to provide leadership in this sphere is enormous. The Community must use more effectively its position of moral, economic and political authority to advance international efforts to solve global problems and to promote sustainable development and respect for the global commons. […]

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[146] European Council, 'The Environmental Imperative' in 'Presidency Conclusions' (Dublin, 25-26 June 1990) SN 60/1/90 annex II, 25.

[147] ibid.

[148] Philippe C Schmitter, 'Three Neo-Functional Hypotheses about International Integration' (1969) 23 International Organization 161, 165.

[149] European Council (n 146) 25.

> Recent scientific assessments show that man-made emissions are substantially increasing the atmospheric concentration of greenhouse gases and that a business-as-usual approach will lead to additional global warming in the decades to come. We urge all countries to introduce extensive energy efficiency and conservation measures and to adopt as soon as possible targets and strategies for limiting emissions of greenhouse gases.[150]

Again, this statement argued that the histories of integration have created a special capacity and position for the EU to lead global climate negotiation. It also recognised the importance to act at a global level, and asked the Commission to develop 'a strong Community position in preparation for the Second World Climate Conference' in October 1990.[151] Therefore, on the one hand, the European Council has sent a clear message to the world, right at the beginning of the whole climate negotiation, that the EU will lead the international debate; on the other hand, the link between integration and EU's external leadership has set the tune for climate policy discussion, as shown in many EU public documents.[152]

Combating climate change has hence become a common *value* or *identity* of the EU that emerged from the contemporary history of European integration and globalisation. An integrated Europe has provided an environment for progressive climate actions, which could further 're-legitimise European integration' and strengthen the EU's global leadership.[153] This was a key purpose of creating the 2-degree target, as a tool that 'the EU could go out internationally and push for'.[154] In

[150] ibid 27.

[151] ibid.

[152] EEA, 'Environment in the European Union: Report for the Review of the Fifth Environmental Action Programme' (EEA 1995); EEA, 'Climate Change in the European Union' (EEA 1996); Commission, 'Climate Change - Towards an EU Post-Kyoto Strategy. Communication from the Commission to the Council and the European Parliament. COM (98) 353 Final, 3 June 1998' (1998) EU Commission - COM Document.

[153] Sebastian Oberthür and Marc Pallemaerts, 'The EU's Internal and External Climate Policies: an Historical Overview' in Oberthur and Pallemaerts (n 144) 46.

[154] Interview with KA (26 August 2013).

addition to the literature and the archival evidence, many experts also emphasised during interviews the importance of global environmental leadership in the EU climate risk discussion.[155] 'The 2-degree target', a senior expert in the EU ad hoc group of climate experts commented, 'was meant for international consumption'.[156] Hence, similar to the case of the fiscal rules discussed earlier, risk communications about climate change were *intrinsically integrated* with the historical background of European integration and the EU's position in the world.

This notion of EU global leadership reflects a wider historical context of accelerated globalisation and trade liberalisation toward the end of the Cold War. Externally, the European Community was under huge pressure of losing its economic and political advantages at the global level. This awareness of growing global competition formed part of the fundamental rationale of monetary integration, as explained early on in the Delors Report:

> The establishment of an economic and monetary union would give *the Community a greater say in international negotiations* and enhance its capacity to influence economic relations between industrial and developing countries.[157]

This external dimension of the benefits of monetary integration was supported by the Commission's 'One market, one money' paper, claiming that the EMU 'will also have far-reaching implications for the world economy.'[158] It was argued that a common European currency would emerge as a strong competitor to the dollar, feature in foreign exchange reserves and private transactions, as well as strengthen the EU's role

[155] Interviews with ES (12 March 2013), KT (30 September 2013) and JP (6 September 2013).

[156] Interview with BN (10 July 2013).

[157] Delors Report (n 67) para 35 (original emphasis).

[158] Commission 'one market, one money' report (n 116) 178.

in world economic policy.[159] Although academic research in the 90s generally doubted the real impact of European monetary integration on the rest of the world[160], this strong political will to establish the EU in the globalised world has certainly given a particular steer to the process of risk communication and the weighting between pros and cons of the EMU project:

> The whole thing started always from the idea: Europe has to be a player in globalisation. […] To compete with the US on a global scene, you need not only to have a big single market with the same rules of the game, but you need to have a single currency, because the cost of uncertainty in trade and investment was becoming higher and higher. […] This is one of the main reasons why we want to maintain the euro despite all the cost that is entailed to us.[161]

Other interviewees also expressed that the issue of global competition has shaped the EMU debate.[162] The above comment shows how risks, identified as 'costs' of the EMU, were discussed together with the potential benefits of euro to enhance the competitiveness of the EU in globalisation. From a retrospective point of view, however, it seems that the 'benefit side' of this EMU cost-benefit analysis was over-emphasised against this backdrop of globalisation.[163] Yet clearly the notion of 'global competition' has become a key argument for the EMU project.

In both cases, we see how the historical trend of intensified globalisation and its interpretation in the particular context of European integration have co-evolved with the discussion of the two risk regulatory standards (the 2-degree climate target and the

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[159] ibid ch 7; also Gros and Thygesen (n 114) ch 9.

[160] Barry J Eichengreen, *Should the Maastricht Treaty Be Saved?* (Princeton Univ Intl Economics 1992) Ch 7; Jose Vinals, 'Building a Monetary Union in Europe: Is It Worthwhile, Where Do We Stand, and Where Are We Going?' (Centre for Economic Policy Research 1994) CEPR Occasional Paper No. 15 8.

[161] Interview with CS (27 Jun 2013).

[162] Interviews with NW (11 March 2013) and IN (3 July 2013).

[163] The historical background hence also facilitated a 'positive framing' of risk. This will be further discussed in Chapter 5 on positive and negative framing of risk in terms of risk as part of the 'cultures' of risk communication.

EMU fiscal rules). Most importantly, it shows how the theme of globalisation has generated some interesting 'vocabularies' during the process of risk communication. Therefore, it seems that *historical trajectories can shape the language of risk communication*. It is also worth noting that this common trend of globalisation has actually shaped risk communication in different directions: in the euro case, the language of 'global competition' triggered a more positive approach toward the risks of the EMU, whereas in the climate case, the idea of 'global leadership' encouraged the EU to adopt more risk-averse policies. To further unpack this interesting variation in the effects of a common trajectory, one must also look at events that happened 'before' the major discussions of the two cases and investigate the impacts of historical legacies.

3.3 Historical legacies of monetary integration and acid rain control

There were two early projects of European integration, as historical legacies, which became the foundation of the two risk regulatory standards: the logic behind the EMU fiscal rules was based on the experience of several unsuccessful attempts of European monetary integration in the 1970s and 1980s; similarly, the concept of deriving emission reduction targets from a single temperature limit was borrowed from the established European scientific model in the field of air pollution control. Of course, it might seem self-evident to claim that previous debates can influence current discussions. However, my argument here is that these historical legacies have set the main direction of risk communication, and indirectly shaped the adoption of divergent risk conceptions in the two case studies.

I shall begin my analysis with the euro case. European monetary integration was not a new topic in the 90s. After the decline of the Bretton Woods system, two major

reports were presented by the European Commission in the 1970s, which led to the establishment of the European Monetary System (EMS) as a laboratory of European monetary integration. These two reports were the 1970 *Werner Report*[164] and the 1977 *McDougall Report*[165]. The Werner Report, as the first coherent plan for creating a monetary union, was an extremely crucial document in the history of European monetary integration and was also explicitly cited by the Delors Report.[166] A rather centralised version of 'fiscal harmonization' was proposed by the Werner Report to 'make possible the abolition of fiscal frontiers'.[167] Addressing a similar fiscal issue in a more technical sense, the McDougall Report suggested that to ensure a stable European monetary union, it would require a bigger Community budget comparable to other federal states.[168] In the end, the Delors Report presented a compromised version of 'fiscal coordination', but my main argument here is that these old reports had significantly anchored the discussion of the (in)stability of the EMU to the issue of public finance regulation.

This argument is supported by historical research that demonstrates the long lasting debate between the *monetarist* and the *economist* schools of European monetary integration.[169] The 'monetarists', supported mainly by France, saw a monetary union as a key driving force for European integration, whereas the

[164] Werner Report (n 80)

[165] Commission, 'Report of the study group on the role of public finance in European integration' (Brussels, April 1977) II/10/77 (McDougall Report).

[166] Delors Report (n 67) paras 1 and 22. In fact, the Delors Report adopted the basic format of the Werner Report, including the three stages of implementation and the conditions of monetary union.

[167] Werner Report (n 80) 11. Niels Thygesen, 'Fiscal Institutions in EMU and the Stability Pact' in Andrew Hughes Hallett, Michael M Hutchison and Svend E Hougaard Jensen (eds), *Fiscal Aspects of European Monetary Integration* (CUP 1999) 16–17.

[168] McDougall Report (n 165) 12-18. This view was supported by the former President of the Commission, Roy Jenkins, in his speech at the EUI: Roy Jenkins, 'Europe's Present Challenge and Future Opportunity. First Jean Monnet Lecture, Florence, European University Institute' (1977).

[169] Maes (n 70); Szasz (n 70) 9–11.

'economists', influenced by Germany, emphasised the importance of converging economic performances before establishing a monetary union.[170] This monetarist-economist debate defined the basic language of EMU discussion to focus on the area of public finance. In fact, as one expert who closely observed the negotiation suggests, this root can be traced back to almost the beginning of European integration:

> Let's say the discussion on public deficit is an old discussion. There is a very big *continuity* in this discussion among the experts from the 1960s. […] In a sense, the Commission already in the 1960s had plans for a monetary union, even before the Werner Report, and the central bankers were critical of this, and said you should do something on the budgetary side. So this is an old discussion.[171]

The 'continuity' of the monetarist-economist debate has confined the scope of risk communication in the case of the EMU to the field of fiscal coordination. The internal minutes of the MC meetings also demonstrate this continuity, with 'budgetary disciplines' and 'convergence' as dominant themes of EMU discussion.[172]

Compared to the early attempts of European monetary integration, the historical legacy that influenced EU climate policies was, in a sense, more 'technical'. The *RAINS model* (Regional Air Pollution Information and Simulation Model) was a so-called integrated assessment model used in Europe to provide policymakers about information related to acid deposition. This model was developed by the International Institute for Applied Systems Analysis (IIASA) based in Austria.[173] As a tool to evaluate different options to reduce acid rain in Europe, the RAINS model was a response to the 1979 Convention on Long-Range Transboundary Air Pollution

[170] ibid.

[171] Interview with IN (3 July 2013)

[172] Meanwhile, other potential 'risks' of the EMU, such as private sector debts, banking regulation and relative incompetitiveness of peripheral countries, were neglected. In Chapter 6, I will further discuss the 'attenuation' of risk and regulatory blind spots in the euro case.

[173] 'The RAINS Model - Cleaning Europe's Air - IIASA' <http://www.iiasa.ac.at/web/home/about/achievments/scientificachievementsandpolicyimpact/cleaningeuropeair/The-RAINS-Model.en.html> accessed 23 May 2014.

(CLRTAP), which was signed under the framework of the UN Economic Commission for Europe (UNECE).[174] In short, the RAINS model was considered a great success because not only was it accepted politically, but also deemed as a credible and accessible scientific tool to facilitate air pollution control in Europe.[175]

The successful story of RAINS has undoubtedly inspired climate scientists. The IIASA itself was also involved in climate change research,[176] and has been promoting the extension of the RAINS methodology to cover greenhouse gases.[177] The RAINS model for air pollution was 'a good example', as one interviewee commented, to establish the 'science-policy interface',[178] and this positive experience triggered the birth of the IMAGE model (Integrated Model to Assess the Global Environment), developed by the Dutch group.[179] The IMAGE model has contributed to the climate negotiation, but what is more interesting is perhaps the similar logic behind the 2-degree target and the use of RAINS model for the CLRTAP:

> I think what is important is actually what happened before (the climate change debate). It was acid deposition in Europe. There was a successful international network for acid rain, the CLRTAP, from the UNECE. They were managing this transboundary air pollution with something called '*critical loads*'. It is basically the concept [to decide] countries' level of acid deposition that ecosystems can cope with, and there is a scientific method (the RAINS model) that you can use to determine this.
> For this CLRTAP example, […] they designed a system around 'critical loads' to calculate which country should reduce its emission by how much, in order to be most efficient. (Determine critical loads,) then calculate

[174] Leen Hordijk, 'Use of the RAINS Model in Acid Rain Negotiations in Europe' (1991) 25 Environmental Science & Technology 596.

[175] ibid 601–602.

[176] '40 Years' Research into Climate Change - IIASA' <http://www.iiasa.ac.at/web/home/about/achievments/scientificachievementsandpolicyimpact/From-Ice-Age-to-Heat-Wave.en.html> accessed 23 May 2014.

[177] Ger Klaassen and others, 'The Extension of the RAINS Model to Greenhouse Gases' (IIASA Interim Report IR-04-015, 2004).

[178] Interview with KX (1 April 2014).

[179] 'IMAGE model site - PBL' <http://themasites.pbl.nl/tridion/en/themasites/image/index.html> accessed 26 May 2014; Hordijk (n 173).

> backwards, to how much emission should be allowed. […] This idea, because it was successful, was copied to climate change, and we thought what worked for acid deposition, may also work for climate change. Then you have this question: (in climate change) what is the equivalent of critical loads?[180]

The answer, according to the same expert who was involved, was temperature targets. Although the IMAGE model was not as widely accepted as the RAINS model,[181] the way how the concept of 'critical loads' were used in the area of air pollution has clearly led to the focus on global mean temperature in the discussion of the 2-degree target.

Therefore, discussions in the past and the particular concepts and models they mobilised (the monetarist-economist debate and the critical loads of the RAINS model) have paved the basic path for current debates. In both case studies, *historical legacies created anchoring effects for the direction of risk communication.* The term 'anchoring', originally developed by cognitive psychologists, describes how people make biased decisions relying on some (random) initial pieces of information.[182] Of course here I am not suggesting that experts in the two cases were 'biased' or those old discussions were 'irrelevant', but the notion of 'anchor' does capture the power of historical legacies: in addition to merely shaping the language of risk communication, they may define the course of discussion by focusing on specific aspects of the topic related to risks and make it difficult to deviate from that course. This again explains how certain views of risk are developed and how inter-expert risk communication hence bears the imprint of 'path dependence' that leads to the construction of two divergent risk conceptions.

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[180] Interview with SS (31 March 2014).

[181] ibid.

[182] Daniel Kahneman, *Thinking, Fast and Slow* (Penguin 2012) ch 11.

3.4 History matters

Junctures, trajectories and legacies all have significant impacts on the practice of risk communication. From the previous empirical analyses, I have demonstrated that in both cases, risk communication activities were *accelerated by junctures*, *shaped by trajectories* and *anchored by legacies*. The following table summarises the arguments of this section.

Table 3.1: Historical events and risk communication

	Euro case	**Climate case**
Junctures	German reunification	
	Catalysts of risk communication	
Trajectories	Globalised competition	Global environmental leadership
	Vocabularies of risk communication	
Legacies	Monetarist-economist debate	Critical loads of RAINS model
	Anchors of risk communication	

Historical events are not just plain, descriptive background information, but actively influence inter-expert risk communication. It is important to be constantly aware of the impacts of history in my analysis. This section also shows how the two very different case studies can be compared in relation to a single analytical theme. Thus in the following four chapters, instead of analysing the two case studies separately, I will seek to integrate the two in order to provide a sharper contrast between the two diverging views of risk.

The materials presented in this chapter, including both the general introduction and empirical analysis, will be revisited throughout the whole thesis. In fact, Section 1.2 and 2.2 have already introduced several key actors of risk communication in the

two cases. These are the three expert groups (the EU in-house experts, the Dutch group and the WBGU) in the climate case, and the Commission and the MC in the euro case. In the next chapter, I will bring out more relevant actors, and discuss the *networks* of risk communication between these actors.

Chapter 4
Networks: Bridge and Club

In this first empirically based analytical chapter, I will discuss 'networks' formulated by various experts who took part in the discussions of the two risk regulation standards. By networks I mean the structure of relationships between different actors involved in inter-expert risk communication. As this DPhil thesis focuses on the institutionalisation of risk conceptions, the study of networks is crucial for my institutionalist approach, because networks are scaffolds and carriers of institutional effects, and they can 'reflect key micro-level interactions that influence institutional dynamics'.[1] In the case of making the 2-degree climate target, the network of inter-expert risk communication can be described as a 'bridge'; in the case of negotiating the EMU fiscal rules, the similar network can be understood as a 'club'. These two networks, together with the 'cultures' of risk communication that I will discuss in the next chapter, represent the general environments in which inter-expert risk communication takes place.

The metaphors of *bridge* and *club* reflect not only the institutional arrangements of two risk regulation standard-setting processes, but also the ways in which experts positioned themselves among others in the network of risk communication. The bridge of the climate case, on the one hand, resembles a clear distinction between science and policymaking, with several groups of experts situated across the science-policy divide as boundary organisations. The club of the euro case, on the other hand, mirrors a closed institutional structure with a high level of secrecy, and with no clear separation between technical experts and policymakers. I argue that

[1] Jason Owen-Smith and Walter W Powell, 'Networks and Institutions' in Royston Greenwood and others (eds), *The Handbook of Organizational Institutionalism* (SAGE 2008) 594, 596.

these two networks of risk communication, the bridge and the club, have further entrenched the social and the economic views of risk, respectively, and this kind of entrenchment can be explained by path dependence.

I will first introduce some concepts borrowed from the social network analysis literature that are used in this chapter to describe different constellations of actors in the two cases of inter-expert risk communication (Section 1). Then I will analyse the two case studies separately: the climate 'bridge' was formed by three different expert groups, resulting in sporadic but competitive risk communication (Section 2), whereas the euro 'club' was built on overlapping memberships of experts, leading to intensive yet harmonious risk communication (Section 3). Finally I will discuss how the two networks were reinforced through the path dependent process of risk communication, and thus become a basis for constructing the two divergent, i.e. the 'social' and the 'economic', conceptions of risk (Section 4).

1. Actors of Risk Communication: Linking Science and Policymaking

In the previous chapter I have introduced the main actors involved in the two case studies (Section 1.2 and 2.2, Chapter 3). The purpose of this chapter is to observe how these actors related to each other and formed networks to communicate risks. Two analytical concepts are particularly important for my observation here — the *science-policy* spectrum and the *centrality* of networks.

The first concept imagines the differences between 'science' and 'policy' as a spectrum, and allocates actors across this spectrum accordingly. In the literature of science communication, there is a general conviction that a 'gap' or 'divide' exists

between science and public policy.[2] This gap/divide, however, is treated much more critically in the public policy literature that focuses on the study of 'science policy', i.e. the role of science in policymaking. Scholars like Jasanoff criticise the naïve view of characterising science policy as 'speaking truth to power', and challenges both the 'technocratic' (better science policy through better science) and 'democratic' (better science policy through more public participation) critiques of scientific advisory in regulation.[3] The line between science and policy is a result of 'boundary work', a social process of negotiating, constructing and deconstructing scientific knowledge that guarantees the legitimacy of regulatory science.[4] The science-policy divide is therefore socially constructed and should not be taken for granted — just as the subtitle of Jasanoff's seminal book suggests, scientific advisers themselves have also become policymakers, and the two spheres of 'science' and 'policy' are interlinked.[5] Inter-expert risk communication, in this sense, covers all the activities involved in 'negotiating' science for the purpose of policymaking.

However, instead of directly criticising or defending this divide between 'science' and 'policy', I take a more pragmatic view and recognise that a distinction between the two spheres of scientific research and public policymaking does exist in practice, or in other words, they represent 'distinct forms of life' that can be observed in

[2] Detlof von Winterfeldt, 'Bridging the Gap between Science and Decision Making' (2013) 110 Proceedings of the National Academy of Sciences 14055; Walter V Reid, 'Bridging the Science–Policy Divide' (2004) 2 PLoS Biol e27.

[3] Sheila Jasanoff, *The Fifth Branch: Science Advisers as Policymakers* (Harvard University Press 1998) 4–19. While Jasanoff's critical approach leads her to focus on the legitimacy of science, Liz Fisher, from a rather different point of departure, also makes a similar critique of the dominant 'science-democracy dichotomy' and proposes that one should foreground the role of law and public administration in risk regulation. Elizabeth Fisher, *Risk Regulation and Administrative Constitutionalism* (Hart Publishing 2007) 6–26.

[4] Jasanoff (n 3) 14, 234–241, 249–250.

[5] Jasanoff (n 3); Sheila Jasanoff, 'Ordering Knowledge, Ordering Society' in Sheila Jasanoff (ed), *States of Knowledge: The co-production of science and the social order* (Routledge 2004) 13, 30.

reality.[6] Therefore I argue that the concept of a science-policy divide is useful at least at an analytical level, especially if we imagine such divide as a *spectrum*. In this spectrum, there might be 'pure' scientists who only work in laboratories and 'pure' policymakers who focus only on the politics, but most actors involved in making risk regulation standards should actually be located somewhere between the two extreme ideal types. Locating actors along this spectrum between science and policy can help identify the networks they formulated. Of course, one might question that this approach still presupposes the existence of a divide and hence may be biased. However, as my analysis will show, the two case studies in fact reveal very different patterns of networks and treatments of the imaginary divide: while the climate 'bridge' enhanced this divide, the euro 'club', ironically, bridged the gap.

The second concept that helps my analysis here is the notion of *centrality* in the social network literature. In the field of communication studies, network analysis has been focusing on the consequences of various 'network structures' in social actions.[7] The term 'centrality' is used to examine and measure the network structure of a group of 'nodes',[8] which in my research represent various actors involved in the practice of risk communication. Although I do not apply strict graphical/mathematical analysis of node relations that measures the centrality of actors in a network in a quantitative sense, the concept can still shed light on my empirical observation.

Focusing on centrality can demonstrate whether a network is closed or open. In social network studies, an 'ego network' (the ties between a set of nodes with its focal

[6] Clark Miller, 'Hybrid Management: Boundary Organizations, Science Policy, and Environmental Governance in the Climate Regime' (2001) 26 Science, Technology, & Human Values 478, 482–483.

[7] Stephen P Borgatti and others, 'Network Analysis in the Social Sciences' (2009) 323 Science 892.

[8] Linton C Freeman, 'A Set of Measures of Centrality Based on Betweenness' (1977) 40 Sociometry 35.

node, the 'ego') is used to measure the 'social capital' of the focal node.[9] Two basic types of ego networks, open and closed, are identified (Figure 4.1). A perfectly closed ego network means a cohesive, dense and highly centralised network where everyone is well-connected to each other, formulating a 'network closure'; an open network, in contrast, contains fewer ties and more 'structural holes' between nodes.[10] It is argued in the social network literature that both *closure* and *holes* are sources of social capital: a closed network guarantees access to information, facilitate trust and improve communication, whereas in an open network, structural holes can reduce redundant information flow and increase competitive advantage.[11] Again, while the quantitative methods applied in the field of social capital are considerably different from my qualitative approach, the analytical framework of open/closed network, based on different levels of centrality, is quite helpful to examine the networks of inter-expert risk communication in my two case studies.

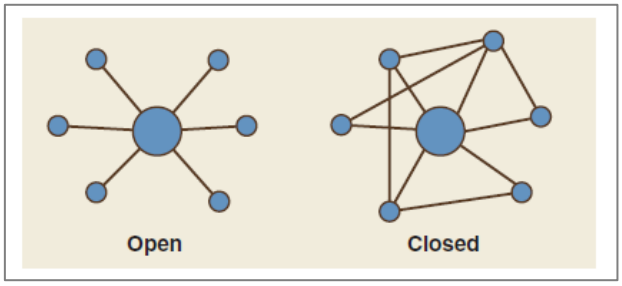

Figure 4.1: Two types of ego networks.[12]

[9] Ronald S Burt, 'The Network Structure of Social Capital' (2000) 22 Research in Organizational Behavior 345.

[10] ibid.

[11] ibid; Borgatti and others (n 7).

[12] The one on the left contains many structural holes; the one on the right contains few. Borgatti and others (n 7).

Therefore, by combing these two concepts, I can first locate actors involved in risk communication in the science-policy spectrum, and then evaluate the centrality, i.e. the 'density', of the network they formulated. The results of this chapter echo the findings of social network studies: the closed 'club' in the euro case facilitated intensive and harmonious communication of risk, whereas the open 'bridge' in the climate case supported some sporadic yet competitive risk communication activities among experts.

2. Climate Case: Bridge

Many actors are involved in the discussion of climate risks: from the heads of states to local civil servants, from the IPCC to individual climate scientists, and from NGOs to private companies. While it is impossible to draw a comprehensive network of global climate debates, risk communication related to the creation of the 2-degree target in the EU in 1990s is much confined. As introduced previously (Section 1.2, Chapter 3), three major groups contributed to the genesis of the EU climate target: the *EU group*, including the European Environment Agency (EEA) and the climate expert group of the Council; the *German group*, i.e. scientists associated with the German Advisory Council on Global Change (WBGU); and the *Dutch group*, led by the then Dutch National Institute for Public Health and the Environment (RIVM). These three groups, as major interfaces between science and policy, formed the backbone of a 'bridge' network. Discussions of climate risks in relation to the 2-degree target were thus sporadic yet competitive, reflecting the nature of these 'climate bridges'.

2.1 Three boundary organisations as bridges

The notion of 'boundary organisation' was raised by several interviewees to describe the institutions they worked with.[13] The term borrows from the concept of 'boundary object' — an object that situates between two different social worlds (e.g. science and politics) and can be perceived differently, without losing its own identity.[14] Guston argues that a boundary organisation, similar to a boundary object, can blur the line between science and policy, provide space for participation from both sides of the boundary, and most importantly, pursue the interests of both science and politics.[15] The functions of a boundary organisation are manifold: 1) it 'translates' science for policymaking; 2) it communicates research needs to scientists; 3) it protects the legitimacy of both sides of the boundary; 4) it provides a neutral forum; and 5) it facilitate trust between the two sides.[16] Boundary organisations are, simply put, bridges across the science-policy divide.

A boundary organisation therefore lies in the middle of the spectrum that spans science and policymaking. All three major groups of experts involved in the risk communication of the 2-degree target (i.e. the EU, Dutch and German experts) can be identified as boundary organisations and placed onto the spectrum. Interviewees who worked with more than one group often commented that these organisations share reasonably similar tasks, though they may have slightly different orientations and

[13] Interviews with AI (28 August 2013), ES (2 September 2013), DK (30 September 2013) and KX (1 April 2014).

[14] David H Guston, 'Boundary Organizations in Environmental Policy and Science: An Introduction' (2001) 26 Science, Technology, & Human Values 399, 400; David H Guston, *Between Politics and Science: Assuring the Integrity and Productivity of Reseach* (CUP 2000) Ch 1.

[15] Ibid.

[16] Alister Scott, 'The Dissemination of the Results of Environmental Research - A Scoping Report for the European Environment Agency' (EEA 2000) Environmental issues series 15, 15–16.

focus on different levels.[17] For example, the WBGU, being an independent scientific advisory body to the federal government of Germany, operates through a loose organisation consisting of 9 four-year-term members (12 in its first two terms from 1992 to 1996) and an administrative secretariat.[18] The WBGU, as a relatively young and small organisation, relies heavily on collaboration with many external research institutions to perform its tasks. The Dutch RIVM, on the contrary, is a much older and larger organisation, and conducts research directly by itself.[19] Research regarding the traffic lights system and the safe landing analysis at the time was done mainly within the RIVM framework.[20] Therefore, although both the WBGU and the RIVM can be described as 'boundary organisations', the RIVM should be put closer to the science side on the spectrum, as it generates first-hand knowledge, whereas the WBGU links more directly to policymaking, as it seeks 'to provide science-based guidance for policymakers'.[21]

Reports of the WBGU and the RIVM may have global impacts, but they are mainly designed for national consumptions. The EU experts, on the other hand, aim directly at risk communication at the EU level. The EEA, mentioned 2℃ in passing in

[17] Interviews with AI (28 August 2013, expert at the RIVM and the EEA), GF (28 August 2013, expert at the WBGU and the EEA) and UG (1 October 2013, expert at the WBGU and the RIVM)

[18] WBGU, 'Joint Decree on the Establishment of the Council'<http://www.wbgu.de/en/about-us/decree-of-establishment/> accessed 11 May 2015.

[19] RIVM, 'About RIVM' <http://www.rivm.nl/en/RIVM/About_RIVM> accessed 11 May 2015.

[20] Principal authors of the following reports were based at the RIVM: Frank R Rijsberman and Rob J Swart (eds), *Targets and Indicators of Climatic Change* (Stockholm Environment Institute 1990); Pier Vellinga and Rob Swart, 'The Greenhouse Marathon: A Proposal for a Global Strategy' (1991) 18 Climatic Change vii; Robert Swart and others, 'The Safe Landing Approach: Risks and Trade-Offs in Climate Change' in Joseph Alcamo, Rik Leemans and Eric Kreileman (eds), *Global Change Scenarios of the 21st Century: Results from the IMAGE 2.1 Model* (Elsevier 1998) 193. It is also worth noting that the task related to climate change has moved from the RIVM to the Netherlands Environmental Assessment Agency (PBL) since 2008, due to restructuring of a government reform programme. The PBL and the RIVM, however, still share office space and operate largely in the same location. PBL, 'About PBL' <http://www.pbl.nl/en/aboutpbl> accessed 12 May 2015.

[21] WBGU, 'Serving Global Change Politics' (WBGU 2013) 2.

its 1995 report,[22] is sometimes considered a good example of a boundary organisation, as it has an independent structure, a good capacity for providing consistent and systematic policy syntheses, and does not involves directly in research activities.[23] However, the EEA in the early 1990s was very different from today: it operated as a small task force of 15 people within DG Environment of the Commission with very limited resources.[24] Research suggests that the EEA tried very hard to differentiate itself from the conventional mode of environmental information in DG Environment, and to establish its own institutional identity as well as a new model of knowledge production at the intersection of science and politics.[25] As I will discuss further in Section 4 of this chapter, the development of the EEA reflects the path dependent nature of risk communication network — the growth of 'bridges' can only enhance, not reduce, the science-policy divide.

While the EEA task force only had limited influence in early climate debates, most EU experts at the time worked in the preparatory bodies of the Environment Council. Their work contributed directly to the adoption of the 2-degree target in the 1996 Council Conclusions.[26] According to archival records and interviews, meetings of the Environment Council related to climate change were firstly prepared by the ad hoc 'climate expert group', and then discussed by the Permanent Representatives

[22] EEA, *Europe's Environment: The Dobris Assessment* (EEA 1995) 520.

[23] Scott (n 16). This is also highlighted by several interviewees: for example AI (28 August 2013), GF (28 August 2013), ES (2 September 2013) and SK (6 September 2013).

[24] Interviews with ES (2 September 2013) and SK (6 September 2013); the lack of professional archival management at the EEA archives also reflects its limited resources at the very beginning of the Agency. See the Appendix on data sources for more details.

[25] Claire Waterton and Brian Wynne, 'Knowledge and Political Order in the European Environment Agency' in Sheila Jasanoff (ed), *States of Knowledge: The co-production of science and the social order* (Routledge 2004) 87.

[26] Council, 'Community Strategy on Climate Change — Council Conclusions' (8518/96, Brussels, 25 and 26 June 1996) 14

Committee (Coreper).[27] This ad hoc climate expert group should not be confused with the Ad Hoc Group on the Berlin Mandate (AGBM), which was set up by the first Conference of the Parties (COP1) to the UNFCCC in Berlin in 1995 as a special negotiating body for preparatory work of the Kyoto Protocol. However, as some interviewees pointed out, delegates of the EU countries to the AGBM were usually the same group meeting at the Coreper regarding climate issues, suggesting that the internal and external perspectives of EU climate policy were closely linked.[28] The Council therefore subdivided its preparatory bodies into a more technical-related climate expert group and an AGBM/Coreper group that dealt more directly with decision-making. The internal expert groups of the Council may not be boundary organisations by strict definition, but their two-level structure still reflects a spectrum between science and policymaking.

The above analysis allows us to put actors related to the climate change debates onto the science-policy spectrum, as shown in Figure 4.2.

Figure 4.2: The bridge network of the climate case[29]

[27] The 'climate expert group', named by some interviewees, was sometimes referred as 'ad hoc group of experts', 'ad hoc Group "Climate"' or simply 'ad hoc Group' in different records. For the relations between the EU climate expert group and the Coreper see for examples: Council, 'Preparation of the "Environment" Council meeting on 25 June 1996' (8063/96, Brussels, 11 June 1996); Council, 'Community strategy on climate change — Draft Council conclusions' (7925/96, Brussels, 4 June 1996); Council, 'Community strategy on climate change – Draft Council conclusions' (12704/95, Brussels, 13 December 1995); Council, 'Preparation of the "Environment" Council meeting on 18 December 1995' (12407/95, Brussels, 5 December 1995).

[28] Interviews with JP (6 September 2013), CM (2 April 2014) and JI (25 August 2013). Members of the Coreper are normally generalists and higher ranked national civil servants.

[29] The figure seeks to distinguish national/international actors (upper row) from EU actors (lower row). Moreover, as explained in the main text, it is important to note that some organisations lean closer to science/research, while others focus more on policymaking.

The communication of climate risks was situated in a loose network of different actors at various levels, with three 'bridges' linking a wider scientific community and the final decision-making bodies. It is an open network with low centrality, and it relies on key actors as 'boundary spanners' to effectively discuss climate risks.[30] This bridge network not only reflected the institutional structure of climate debates in the EU, but also shaped the behaviours of experts in terms of how climate risks were actually communicated.

2.2 Sporadic and competitive risk communication

Environments shape behaviour. Many interviewees pointed to a 'gap' between science and policymaking, and this conviction reflects the network that they were situated in.[31] The gap (or 'structure holes', as the social network literature termed) between the wider scientific community and the Council was the main feature of the network that shaped communications of climate risks in the EU. There was already a well-established field of climate change within the scientific community since the 1980s.[32] There was also a strong political will expressed by the European Council in 1990 to tackle climate change.[33] The communication between the two spheres about climate risks, however, remained *sporadic* and was based on *competition* between different boundary organisations.

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[30] Naim Kapucu, 'Interagency Communication Networks During Emergencies Boundary Spanners in Multiagency Coordination' (2006) 36 The American Review of Public Administration 207.

[31] 11 out of 19 interviewees in the climate case conceptualise the difference between climate science and climate policy as a gap.

[32] Two leading specialist journals in the field, 'Climate Change' and 'Journal of Climate', were launched since 1978 and 1988, respectively.

[33] European Council, 'The Environmental Imperative: Declaration by the European Council' (SN 60/1/90 Annex II, Dublin, 25-26 June 1990) 22.

Risk communication between climate scientists and the Council was sporadic because the process was time-consuming and there existed no systematic patterns of dialogues, at least in the early 1990s. For instance, the first pan European environment report of the EEA, being an extremely challenging task at the time, took nearly four years to complete with the help of many external institutions.[34] The Dutch story was also a case of slowly accumulating risk communication process based on a series of papers published from 1989 to 1997. Moreover, while scientists at the RIVM had already proposed 2℃ as a key indicator in 1990, the target only resurfaced after a creative interpretation of the 1995 IPCC report.[35] The German WBGU, among all three bridges, provided the most direct link between top scientists and politicians. However, as some interviewees argued, this link was based on the historical coincidence of German reunification, which had changed the political and research landscapes in Germany radically, especially in the East.[36] The sporadic, lengthy and unsystematic risk communication triggered by the bridge network was perhaps not too different from the famous Einstein letter to Roosevelt regarding the US nuclear programme: it is all about presenting the right message through the right media to the

[34] EEA, *Dobris Assessment* (n 21). According to internal reports found in the EEA archives, the project started in mid-1991, and there was a wide involvement of various users and stakeholders, including national research institutes (National Focal Points, NFPs), NGOs and several international organisations such as the UN Environment Programme (UNEP), World Health Organisation and OECD. These actors assisted the EEA-TF with data collection as well as reviewing the drafts. Environmental Resources Management, 'Evaluation of the Dobris Assessment and Environment in the European Union' (ERM 1997).

[35] According to minutes released by the Council of the EU, experts were aware that there was a 0.5℃ discrepancy between the '2°C' presented in the IPCC SAR (with a base year of 1990) and the 2-degree target proposed by the EU (with a base year of 'pre-industrial' era). However, experts were satisfied with their interpretation of the IPCC SAR for the 1996 Council Conclusions. Council of the EU, 'Community Strategy on Climate Change- Draft Council Conclusion' (8338/96 ENV 208, Brussels, 18 June 1996). See Section 2, Chapter 7 for more details.

[36] The 'reshuffling' caused by German reunification led to redistribution of research funding between the East and the West, as well as made it possible for political figures with a science background like Angela Merkel to rise. Interviews with TD (4 September 2013) and KT (30 September 2013). See Section 3.1, Chapter 3 for details.

right person at the right time.[37]

The gap between science and policymaking may have made risk communication difficult, but it also created a healthy competition. The story of the 2-degree target was a series of efforts by various actors, who tried different approaches to bridge the science-policy divide with a target. Although almost all interviewees recognised the importance of a climate target, they tended to disagree when it came to which group was more influential in creating the target. A scientist worked with the German group claimed that her contribution was the most important one: 'I know some other people have talked about 2-degree before, but to my knowledge, all these efforts were completely inconsequential.'[38] Responding to this claim, a researcher associated with the Dutch RIVM commented that those contributions alleged by the German WBGU were 'not really influential'.[39] An expert in the EU group, recognising both streams of risk communication, argued that the existing political will at the EU level was perhaps more decisive than any single attempt from the scientific side:

> Oh yes, many fathers of success, I have no problem with that. […] The fact that it was adopted in the Council Conclusions meant that at a high level, at a ministerial level, there was the support.[40]

Therefore, bridges competed with each other in transmitting risk messages, but a solid bridge must be built on both banks of the river. The sporadic and competitive risk communication represents a collective, albeit sometimes messy, effort by all actors to bridge the divide between science and policymaking.

To summarise, three key actors, as boundary organisations, formed the core of

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[37] Lucy Warner, 'Einstein, Roosevelt, and the Atom Bomb: Lessons Learned for Scientists Communicating Climate Change' in Susanne C Moser and Lisa Dilling (eds), *Creating a Climate for Change* (CUP 2007) 167.

[38] Interview with KT (30 September 2013).

[39] Interview with SS (31 March 2014).

[40] Interview with CM (2 April 2014).

risk communication network in the climate case. These three groups connected the wider scientific community and the EU policymakers, formulating a bridge network. This climate bridge, as an open network with structural holes, led to some lengthy, chaotic and competitive activities of risk communication among experts, which were significantly different from those in the euro case.

3. Euro Case: Club

Compared to the climate case, the discussion of the EMU fiscal rules was much more concentrated and involved only a limited number of actors. After all, although the stability of the Eurozone may have some global repercussions, it is still a regional affair. As mentioned, the key forum for the discussion of excessive budgetary deficits in the EU was the *Monetary Committee* (Section 2.2, Chapter 3). The Committee lay right at the centre of the risk communication network, which can be conceptualised as a 'club'. This euro club not only mirrored the special institutional structure of the EMU debate, but also reflected the common worldview of these experts, creating an intensive but harmonious atmosphere for inter-expert risk communication.

3.1 A club with overlapping memberships

Many studies have emphasised the key role of the Monetary Committee (MC) and described it as a 'club'.[41] The majority of my interviewees also explicitly mentioned

[41] Amy Verdun, 'Governing by Committee: The Case of Monetary Policy' (EU Center of California Working Paper 1999); Age FP Bakker, *The Liberalization of Capital Movements in Europe: The Monetary Committee and Financial Integration, 1958-1994* (1st edn, Springer 1995) Ch 4; Andreas Kees, 'The Monetary Committee of the European Community' (1987) 20 Kredit und Kapital 258; Andreas Kees, 'Der Waehrungsausschuß' [1981] Jahrbuch der Europäischen Integration 135.

the ‘clubby’ or ‘collegial’ atmosphere of the MC.[42] However, instead of being a club by itself, the MC, as the centre of the whole EMU negotiation, had created a wider club-like network, thanks to the *overlapping membership* between the MC and many other key actors.

As introduced in Chapter 3, the unique structure of the MC made it a perfect forum for the discussion of monetary integration. Half of the MC’s members came from the central banks of the Member States, whereas the other half came from the ministries of finance and/or economics. Therefore, half of the MC was overlapped with the Committee of Governors of the Central Banks (CoG, where central bankers met), and the other half overlapped with the Ecofin Council. Although technically the MC was only a preparatory body of the Council, its consensus had *de facto* decision making power.[43] With its institutional structure enshrined in the Treaty,[44] the MC was a special body, where the Commission, central bankers and ministers of finance discussed the progress of monetary integration.

On top of its overlapping membership with the CoG and the Ecofin Council, for the purpose of Maastricht negotiation, i.e. the discussion of the EMU fiscal rules, the MC also overlapped with the Intergovernmental Conference (IGC) on monetary union. According to a senior official who participated in the discussion, members of the MC and those in the IGC meetings were actually the ‘same group of people’.[45] In fact, many other interviewees have indicated that the MC, the Alternates of the MC, the IGC, the secondary working group of the IGC, the Ecofin Council, the CoG, and

[42] 12 out of 16 interviewees in the euro case mentioned some features of a club atmosphere.

[43] Verdun (n 40) 16–21; Bakker (n 40) 61; Kees, ‘The Monetary Committee of the European Community’ (n 40).

[44] Article 134 TFEU (ex Article 114 TEC); the Monetary Committee was replaced by the Economic and Financial Committee (EFC) after Stage 3 of the EMU. EFC, ‘About’ < http://europa.eu/efc/about/index_en.htm> accessed 12 May 2015.

[45] Interview with JC (16 April 2013).

perhaps most importantly, the DG II of the Commission, were all closely related to each other.[46] This observation can be further confirmed by comparing the names listed in various archival records. Clearly, actors of risk communication had centred around the MC and created a tight-knit network at the EU level.

If we put these actors on the science-policymaking framework, the MC will overlap with many other bodies, and they will all cluster in the middle of the spectrum, as illustrated in Figure 4.3.

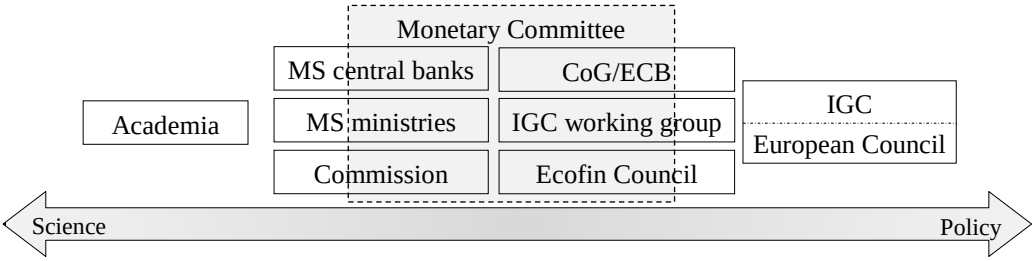

Figure 4.3: The club network of the euro case[47]

The MC and all the other intertwined actors had formed a network of club, some called an 'Old Boys' Club'.[48] One might argue that this 'club' based on the MC can also be understood as a 'bridge' between science (in this case economics and finance) and European monetary policy. However, the institutional power of the MC did not come from its ability to transmit information between two communities. Quite the contrary, it was more about merging the two communities into one interconnected network. The club formulated by the MC was not a 'boundary organisation' defined by Guston that can 'stabilise' the boundary between science and politics[49] — instead

[46] Interviews with NS (8 April 2013), NM (16 April 2013), CS (27 June 2013), HG (27 August 2013) and HR (4 April 2014).

[47] The Monetary Committee overlaps with almost all the other actors, and sits right at the centre of the science-policy divide.

[48] Verdun (n 40) 16–17.

[49] Guston, *Between Politics and Science* (n 14) 27–32.

of *maintaining* the science-policy divide, the club actually leads to *destroying* such divide. In fact, the idea of boundary organisation is sometimes criticised as too simplistic and static, which can be rectified by the notion of 'hybrid management', i.e. highlighting the sophisticated process of managing 'hybrids' in an organisation.[50] In this sense, the club in the euro case is perhaps better described as a network for hybrid management: it mixed different forms of life and grouped different actors into a closed space, but it did not actively maintain a boundary; on the contrary, it went beyond the simple boundary between the techniques of economics and the politics of monetary integration.

Echoing this 'hybrid' nature, other studies also emphasise the special capacity of the MC to deal with technical issues with political sensitivity through a secretive, frank and intensive institutional setting.[51] In other words, the network in the euro case, with the MC at its centre, actually 'shrank' the spectrum and 'closed' the gap between science and policymaking. The euro club was a closed and highly centralised network, and the members of this club had cultivated a common culture that facilitated the negotiation of the fiscal rules.

3.2 Intensive and harmonious risk communication

The club in the euro case was not solely based on the special institutional arrangement of the MC. It was also based on direct personal contacts and an 'influential network of

[50] The bridge and the club represent different treatments of the imaginary 'boundary' between science and policy. I will discuss this point further in Section 4. On the point that 'boundary organisations' actually actively maintain the boundary, see Miller (n 6) 484, 487. The term 'hybrid' means the objects, people and institutions that mix different forms of life, especially between science and politics. Bruno Latour, *We Have Never Been Modern* (Catherine Porter tr, Harvard University Press 1993) Ch 1.

[51] Verdun (n 40); Bakker (n 40) Ch 4.

long-standing acquaintances'.[52] An official who represented the Commission in the MC commented that the EMU project created a community based on 'personal relations' and 'confidence', and recalled that communicating with each other was a 'wonderful experience'.[53] Moreover, this interpersonal network generated what she called 'a common economic culture':

> There was clearly a convergence of minds towards the German model. […] This was what I called the convergence in economic culture between the countries. On top of that, you had the political will of Mitterrand and Kohl, […] which made, I should say, the connection between the economic theory and the political will.[54]

This common economic thinking was made possible through a club that did not insist a clear distinction between economics and its political applications. Another member of the MC also concurred, stating that the 'clubby atmosphere' has contributed to the development of a common worldview that transcended national boundaries, because 'it's the same kind of culture you grew up in whatever country you come from.'[55]

Through shared values, highly centralised structures and interconnected personal relations, experts participated in the discussion of the fiscal rules formulated a club network that, according to the study of social networks, can lead to strong binding mechanisms and facilitate communication and coordination.[56] Indeed, the core debate of the EMU fiscal rules was concluded in a relatively short period of time (especially when compared with the case of the 2-degree climate target), mainly from October 1989 to September 1991, and the topic was discussed very frequently.[57] Moreover,

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[52] Bakker (n 40) 66.

[53] Interview with HR (4 April 2014).

[54] ibid.

[55] Interview with HG (27 Aug 2013).

[56] Borgatti and others (n 7).

[57] During this period of less than two years, the MC has organised 28 meetings, and 12 meeting were noted with high relevance to the discussion of the fiscal rules. This number however does not include

there were multiple dialogues between the Council, the MC, the Alternates of the MC and the Commission, which constantly required confirmation and specification of technical details through expertise at different levels.[58] These rapid and iterative discussions among experts can be characterised as *intensive* risk communication, which was guaranteed by the confidential, collegial environment and the sense of trust based on high centrality and network closure.

But perhaps the most significant feature of the euro club was that it gave rise to *harmonious* risk communication, because the discussion was built on a network of personal relations. 'They tend to become friends', as one expert who worked at a national ministry observed, people knew each other's positions very well, and 'you don't want to offend your colleagues. It was not so contentious.'[59] Of course, this does not suggest that experts never disagree with each other. In fact, as minutes of meetings indicate, the debate between key issues can sometimes be quite intense.[60] However, a club network does imply that forging a consensus was less difficult, as a member of the MC noted:

> Obviously the debate was there, but the atmosphere was always, how should I put it… I should say transparent, friendly, and with a lot of confidence in each other. They were colleagues, you understand? They were not negotiators. […] It was not a fight.[61]

It should be clarified that the notion of 'transparent' mentioned in this context means that experts were clear and frank with their positions, not that the MC was transparent (in fact quite the contrary, the negotiation was successful mainly because of its strict

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meetings with lower relevance, or those meetings of the Alternates and the IGC working groups.

[58] For example, out of 33 documents identified as highly relevant to the discussion of the fiscal rules, 18 of them explicitly required certain technical issues to be confirmed or specified in other bodies.

[59] Interview with CS (27 June 2013).

[60] This was particularly clear when it came to issues such as 'judgement versus automaticity' and determining the 'stages' of the EMU. See Section 3.2, Chapter 6 for some examples.

[61] Interview with HR (4 April 2014).

confidentiality of meetings, hence a 'club'). This sense of trust among experts was established through their personal friendship in a closed organisation, which made the EMU possible.

In summary, actors involved in the discussion of the fiscal rules formed a club network with high centrality and full closure. The MC was at the centre of this club, and experts had developed strong personal relations, trust and a common economic thinking. These characteristics of the euro club allowed experts to communicate the risk of macroeconomic instability in an intensive but harmonious fashion, in order to reach a timely consensus on the fiscal rules for the Maastricht Treaty. This club network is therefore very different from the bridge mentioned above, and they further entrench different conceptions of risk.

4. Expertise, Networks and the Two Views of Risk

Two different networks, the bridge and the club, are identified in my two case studies. One might argue that this difference is simply because there were more people involved in the climate debate, comparing to the rather secretive EMU negotiation. However, I will argue that these two networks were perhaps quite similar in size. Climate change at that time was an emerging field. Although an open network included a wider circle, the discussion of climate change had higher entry barriers in terms of expertise, often described as a 'pioneering group'[62] or 'a small amount of key people'.[63] The euro club, while being exclusive and secretive in its format, did include external experts and was interconnected with many EU actors through their

[62] Interview with ES (2 September 2013).

[63] Interviews with JI (25 August 2013) and SS (31 March 2014).

overlapping memberships.[64]

The real difference, therefore, is not about size, but about centrality/density of actors in the two networks and their treatments of the conceptual divide between science and policy. My comparative study clearly reveals these differences. Of course, top scientists can talk about climate risks with politicians through a 'club' format, and EU technocrats can be the 'bridge' between economic theories and policy debate. Yet the concept of bridge/club network should be understood in a relative sense. In the climate case, experts were not only bridging science and policy, but also *maintaining* the bridge; in the euro case, actors built a club that can resolve political issues through *integrating* politics into technical discussions. Simply put, the bridge enhances the science-policy divide, while the club diminishes it.

This enhancement/diminishment of the science-policy divide can be explained by path dependence, as changes of institutional structures were marginalised, and the continuity of the existing networks prevailed. The two networks reflected different epistemologies of expertise, and they became the foundations of two divergent risk conceptions. The social and the economic views of risk are rooted in the two networks, and entrenched through the process of inter-expert risk communication.

4.1 Path dependence and the science-policy divide

The bridge and the club represent different treatments of the science-policy divide, and this difference is strengthened over time. The interactions between networks and risk communication activities can be explained by *path dependence*,[65] a concept that

[64] External experts and other former experts were sometimes involved, but as I will discuss later, their voices were normally 'filtered' (Section 3.2, Chapter 6).

[65] Path dependence explains why an existing policy becomes 'locked in' or 'sticky', due to high costs of change and relative benefits of continuing down the same path, which creates 'positive feedbacks' or 'increasing returns'. Paul Pierson, 'Increasing Returns, Path Dependence, and the Study of Politics'

can help us understand why different 'views' of risk eventually become paradigmatic through the process of inter-expert risk communication. Historical institutionalists suggest that path dependence is best analysed by looking at change and continuity of institutions.[66] In my two case studies, changes of institutions paradoxically ensured the continuity of the existing networks.

Several organisational changes took place during the discussion of the two risk regulation standards. In the climate case, this was the founding of the EEA as a European agency 'to provide sound, independent information on the environment'[67]; in the euro case, it was the creation of the IGC for the purpose of negotiating the Maastricht Treaty.[68] Both new bodies changed the institutional landscapes of risk communication, but curiously did not really change the overall 'structures' of the two networks. In other words, the bridge/club networks and their corresponding treatments of the science-policy divide were maintained despite the aforesaid changes.

The newly established EEA soon became part of the bridge network. In Section 2, I have shown that there existed a gap (structural holes) between the wider scientific community and the decision-making bodies at the EU level for environment policies in general and climate change issues in particular. It was intended that the EEA, founded in 1994 in Copenhagen, should fill up this void. The Regulation establishing the EEA states very clearly that bridging the gap is the primary objective of the EEA:

Collection, processing and analysis of environmental data at European

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(2000) 94 The American Political Science Review 251.

[66] Wolfgang Streeck and Kathleen Thelen, 'Introduction' in Wolfgang Streeck and Kathleen Thelen (eds), *Beyond Continuity: Institutional Change in Advanced Political Economies* (OUP 2005).

[67] 'Who We Are — European Environment Agency (EEA)' <http://www.eea.europa.eu/about-us> accessed 2 June 2014.

[68] Two IGCs were called in 1989/1990, one on the monetary union and the other on the political union. In this thesis I refer specifically to the IGC on the monetary union: European Council, 'Conclusions of the Presidency' (SN 441/2/89, Strasbourg, 8-9 December 1989) 7-8; European Council, 'Presidency Conclusions' (SN 60/1/90, Dublin, 25-26 June 1990) 5-6.

> level are necessary in order to provide objective, reliable and comparable information which will enable the Community and the Member States to take the requisite measures to protect the environment, to assess the results of such measures and to ensure that the public is properly informed about the state of the environment.[69]

Numerous reports of the EEA confirmed repeatedly this mission of improving science communication and informing policymaking.[70] In fact, the founding of the EEA can be traced back to 1990, roughly the same time when the European Council adopted an active position in environmental policies.[71]

As mentioned, the EEA project started first as a small task force in the Commission. This EEA Task Force (EEA-TF), under the auspices of the Commission with limited resources, focused only on drafting policy papers:

> In the EEA-TF, we did not perform any 'scientific' work, not even profound analysis process, because we were only a few people (approx. 15) and the EEA was not established yet. […] Our work was more gathering, collating and synthesizing work done elsewhere.[72]

The confined yet important task of bridging the scientific community and the EU policymakers has proved valuable (although probably not directly contributing to the making of the 2-degree target) and become the core function of the EEA. Moreover, the mission of the EEA was guided by the aforementioned concept of 'boundary organisation'[73], implying that the Agency should operate as a 'bridge' or 'interface'. One scientist who worked with the EEA commented:

> There is always this bridge, this interface, between science and policy. As

[69] Regulation (EC) 401/2009 of 23 April 2009 on the European Environment Agency and the European Environment Information and Observation Network [2009] OJ L126/13, Preamble (3).

[70] For example EEA, *EEA Strategy 2009-2013 Multi-annual Work Programme* (EEA 2009); EEA, *Environment in the European Union* (EEA 1995); EEA, *Dobris Assessment* (n 21).

[71] European Council, 'Conclusions of the Presidency' (SN 441/2/89, Strasbourg, 8-9 December 1989) 3-4.

[72] Email from SK to author (30 January 2013).

[73] Interviews with ES (12 March 2013), KX (1 April 2014), AI (28 August 2013), GF (28 August 2013) and BM (5 September 2013).

> scientists, you have to go over the bridge to the policymakers, but at a certain moment you have to stop! […] At a science-policy interface institute, it's our job to do these things. You need brokers! You need people and institutes to make this bridge, and I think it should be the job of the EEA.[74]

This comment characterises the task of the EEA as a boundary organisation — on the one hand, the bridge needs to be *crossed*, yet on the other hand, the bridge has to be *maintained*. This interface function has developed rapidly in the EU, and the EEA has grown from a 15-people task force to an organisation with more than 200 staff, and became a key player within the EU environmental policy network.[75] Therefore in the climate case, the structural holes or gaps of the risk communication network have led to relatively sporadic processes of risk communication, which required some active collaborations (bridge-building), a requirement that has further driven the emergence of the EEA to fill in the void and become a 'broker of information'.[76] Intriguingly, although the purpose of founding the EEA was to reduce structural holes and gaps, the continuity of the science-policy divide was actually ensured in the new institutional setting. The climate bridge was stabilised despite this institutional change.

The debate about EMU fiscal rules presents perhaps an even more curious case of this 'change-induced continuity'. As discussed previously, members of the MC and those of the IGC participants were the same group of people. This special structure was constructed specifically for the purpose of negotiating the Treaties, as one expert explained:

> The Maastricht criteria were not developed in the Monetary Committee (MC) *proper*. The MC existed and, for the purpose of the Treaty, converted itself into what was called the Intergovernmental Conference (IGC). […] They had this *dual-role*, so it was quite funny sometimes they were talking as the MC and then just change itself as the IGC. […]

[74] Interview with KX (1 April 2014).

[75] Interview with ES (2 September 2013).

[76] Burt (n 9).

> Because the MC was an advisory committee, whereas the IGC was a negotiating forum. They actually negotiated the Treaty there. I know this is a bit religious but that was a bottom-line: they could not negotiate the Treaty as the MC; they had to change themselves into [the IGC].[77]

The 'dual-role' of members of MC/IGC was thus justified by an artificial institutional setting. According to this institutional design of the Maastricht negotiation, the MC was supposed to be solely an advisory body, and the functions of decision-making and technical expertise should have been clearly separated.

Another senior expert who worked at the DG II of the Commission also noted that the distribution of labour between the MC and the IGC was quite clear in formality, and the members were actually able to 'talk about things as economists and then politically' as well as to adopt different positions in different meetings. However, when asked about whether experts in the MC can really prevent the presentation of national interests, she stressed that the formats of discussion were different, but it was 'just a way to legitimise the works here'. She continued:

> In fact, the MC has changed in that period. What it didn't really manage that well was, it became less of a technical group, and more of a negotiation [one]; and even when the Treaty was over, and all the IGC was over, they were not quite the same MC [as before].[78]

These comments seem to suggest that there is an interactive relationship between the network structure and the process of risk communication. On the one hand, different institutional environments can influence how messages of risk are phrased (experts discussed things technically in the MC but negotiated politically in the IGC); on the other hand, the whole practice of risk communication can also eventually shape the nature of institutional environment (the actual process of Maastricht negotiation pushed the MC toward the policymaking end of the spectrum).

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[77] Interview with JC (16 April 2013).

[78] Interview with NM (16 April 2013).

The above observation is supported not only by some other officials who have participated in the discussion[79], but also several archival documents about 'the role of the MC' before the final rounds of negotiation of the Maastricht Treaty.[80] Hence it seems that although experts did seek to perform differently when they changed hats, the new institutional arrangement (the IGC/MC divide) was eventually rendered inconsequential to the existing network and the well-established club. In other words, the attempt to separate economic expertise from political negotiation only generated some marginal effects on the formality of meetings. The nature of the MC shifted and became more like a policymaking body, reflecting the reality of risk communication activities, whereas the experts remained connected closely in the same club. Again, continuity prevailed.

Therefore, in both case studies, the structures of risk communication networks reflect the actual practice of risk communication — path dependence guaranteed the continuity of networks and downplayed changes. The bridge and the club give rise to different approaches to deal with the science-policy divide. While the two networks were enhanced through the process of risk communication, the two approaches they present became the foundation of the two divergent conceptions of risk.

4.2 Networks as foundations for two divergent risk conceptions

So far I have discussed at length the 'stickiness' of the two networks, 'bridge' and 'club', in the process of inter-expert risk communication, but it is still not clear how these networks actually contributed to the construction of different conceptions of risk.

[79] Interviews with KK (27 June 2013), HG (27 August 2013), VG (11 March 2014) and HR (4 April 2014).

[80] For example: Commission, 'Short Minutes of Monetary Committee 13 March 1991' (II/01624 of 15 March 1991), section 4; Monetary Committee, 'Priorities for the Monetary Committee in the Post-Maastricht Era' (MC/II/19/92-EN of 17 January 1992).

The link between risk communication networks and risk conceptions, I argue, is *expertise*. To elaborate, the social and the economic views of risk become eventually entrenched in the bridge and the club, respectively, because these two networks enhance the use of distinctive fields of expertise in analysing risks.

In the first chapter I have suggested that the social view of risk usually examines risk through a broad range of scientific methods, while the economic view of risk evaluates risk exclusively through the eyes of economics. Of course, this might seem self-evident in my two cases: the discussion of 2-degree climate target is clearly about 'science', and the issue of EMU fiscal rules about 'economics'. However, one should not take the dominance of particular expertise in risk analysis for granted. Climate economics has started to develop since 1970s, but only became influential in Europe recently;[81] the Eurozone crisis has also triggered many critiques to review the EMU project from the angles of politics and social policies.[82] The dominance of climate science in the climate case, and public finance in the euro case, coincided with the construction of two risk communication networks.

This brings back my previous analysis of historical legacies (Section 3.3, Chapter 3). The old monetarist-economist debate of European monetary integration,

[81] Early studies in climate economics tend to be quite critical about rapid mitigation measures, for example: William D Nordhaus, 'Economic Growth and Climate: The Carbon Dioxide Problem' (1977) 67 The American Economic Review 341; William D Nordhaus, 'To Slow or Not to Slow: The Economics of The Greenhouse Effect' (1991) 101 The Economic Journal 920; William D Nordhaus, 'An Optimal Transition Path for Controlling Greenhouse Gases' (1992) 258 Science 1315. However, climate economics re-emerges, most notably after the Stern Review, and becomes a key scientific argument to support climate actions: Nicholas Stern, *The Economics of Climate Change: The Stern Review* (Cambridge University Press 2007).

[82] David Marsh, *Europe's Deadlock: How the Euro Crisis Could Be Solved - and Why It Won't Happen* (Yale University Press 2013); Klaus Busch and others, 'Euro Crisis, Austerity Policy and the European Social Model' (International Policy Analysis, Friedrich Ebert Foundation, Berlin 2013); Kazimierz Laski and Leon Podkaminer, 'The Basic Paradigms of EU Economic Policy-Making Need to Be Changed' (2012) 36 Cambridge Journal of Economics 253; Kevin Featherstone, 'The Greek Sovereign Debt Crisis and EMU: A Failing State in a Skewed Regime' (2011) 49 Journal of Common Market Studies 193.

dated back to the 1960s, took place within the Brussels policymaking circle.[83] This legacy has not only anchored the focus of EMU debate on public finance, but also confined the scope of the network. In other words, historically, at least in the field of European monetary integration, 'economic expertise' was always an integral part of the policymaking circle. The club was not only a closed club, but also an 'old club'. A specific school of economic thinking shared by the euro club, often labelled as the German 'ordo-liberal' school,[84] was politicised for European monetary integration — economics became the hybrid to be managed in the club, and the 'glue' that linked technical experts and politicians.[85] In this euro club, economic analysis was, and still is, the dominant epistemology that guided the discussion of macroeconomic stability in the EMU.

Contrary to the 'old euro club', the climate bridge was built on a relatively recent historical legacy, i.e. the science of the Convention on Long-Range Transboundary Air Pollution (CLRTAP). As mentioned in Chapter 3, the CLRTAP, as an European acid rain regulatory regime developed in the 1980s, gave rise to the Regional Air Pollution and Simulation (RAINS) model and the so-called 'critical loads' method, which was a good case of 'knowledge coproduction' between scientific communities and policymakers.[86] One key contribution of this RAINS-CLRTAP exercise in the area of air pollution control, as studies and interviews suggest, was to bridge the gap

[83] Ivo Maes, 'On the Origins of the Franco-German EMU Controversies' (NBB Working Papers 2002).

[84] Interviews with NW (11 March 2013), KK (27 June 2013), HR (4 April 2014) and EV (3 June 2014); see also Featherstone (n 80) 208.

[85] Miller (n 6) 488.

[86] Jasanoff (n 5); Stacy D VanDeveer, 'Ordering Environments: Organizing Knowledge and Regions in European International Environmental Cooperation' in Sheila Jasanoff and Marybeth Long-Martello (eds), *Earthly Politics: Local and Global in Environmental Governance* (MIT Press 2004) 309.

between research and policymaking.[87] This clear division between science and policy was passed on to the field of climate change and became the underlying logic behind the 2-degree target. The co-production of knowledge in the bridge network can be understood as a result of establishing and maintaining 'a productive tension between the multiple, diverse forms of life'.[88] Experts in the climate case have thus developed a strong tendency to rely on specialised scientific expertise to assess climate risks, and clearly distinguished such expertise from the process of climate policymaking.

The two networks therefore strengthened the use of particular fields of expertise in risk communication: a wider range of natural sciences in the climate case (geology, meteorology, biology, etc.), and a narrower field of public finance in the euro case (in particular the German 'ordo-liberal' school). These two dominant fields of expertise (science and economics) further enhanced the construction of the two risk conceptions (the social and the economic views of risk). The choice of expertise and the different treatments of the science-policy divide are deeply entangled with each other, and they are collectively reinforced by the process of inter-expert risk communication.

Moreover, the development of the two networks also supported two different ways of characterising risks in relation to the normal practice of risk regulation. As introduced previously, the economic view of risk considers risk as part of the routine of public administration, or as normal 'side-effects' of a project that can be managed. Risk management (including evaluation and allocation of risks) is an integral part of public policymaking.[89] With this economic thinking about risk, experts tend not to

[87] Interviews SS (31 March 2014), KX (1 April 2014) and CM (2 April 2014); see also Leen Hordijk, 'Use of the RAINS Model in Acid Rain Negotiations in Europe' (1991) 25 Environmental Science & Technology 596.

[88] Miller (n 6) 487.

[89] Michael Power, *Organized Uncertainty: Designing a World of Risk Management* (OUP 2007); Julia Black, 'The Emergence of Risk-Based Regulation and the New Public Management in the United Kingdom' (2005) 2005 Public Law 512.

distinguish economic expertise from policy decisions, and as my analysis of the euro case suggests, this initial tendency has become a historical legacy and was reinforced over time, turning into a closed club network. Contrary to the economic view, the social view of risk sees risk as something special, abnormal and in need of being actively regulated. Evaluation and allocation of risk, as a collective social issue, requires specialised expertise, additional regulatory attentions and strong scientific evidence. From the perspective of this social view of risk, there is a tradition to functionally separate risk assessment from risk management in many risk regulatory regimes.[90] The image of a bridge clearly reflects this functional separation and the role of inter-expert risk communication. As my case study on climate change shows, the bridge network with a clear gap between science and policymaking was also strengthened through risk communication activities. From 'expertise' to 'normality', the two networks of risk communication gave rise to different conceptions of risk.

The other two features of risk conceptions, i.e. probability and impact, are less relevant to the analysis in this chapter. The two networks are thus not directly influencing the more narrowly defined notion of 'risk' as the probability of an adverse event,[91] but they are undoubtedly crucial to the communication and conceptualisation of risk in relation to standard-setting. The bridge and the club, together with their corresponding approaches to deal with the science-policy divide, form the foundations of the two paradigmatic views of risk. Networks therefore provide the fundamental environments for risk communication, and they also have repercussions in all other dimensions of risk communication, from 'cultures' (networks influence the way

[90] Food safety regulation is a classic example, especially in the EU. Alberto Alemanno, *Trade in Food: Regulatory and Judicial Approaches to Food Risks in the EC and the WTO* (Cameron May 2007).

[91] The Royal Society, *Risk: Analysis, Perception and Management - Report of a Royal Society Study Group* (The Royal Society 1992) 2–4.

experts persuade each other) to 'dynamics' (networks shape the selection of information) and to 'strategies' (networks lead to different rationales for compromises). These three other analytical dimensions will be further discussed in the following chapters.

The findings of this chapter are summarised in Table 4.1. The bridge and the club, depicting the 'structure' of inter-expert risk communication, are the first set of observations that explain the development of the two diverging risk conceptions. The path dependence of the two paradigmatic views of risk will be further elaborated throughout this DPhil thesis, by looking at different aspects of risk communication. In fact, as I will discuss in the next chapter, these two risk communication networks have profound impacts on experts, and they eventually contributed to the formation of two divergent risk communication 'cultures', where risks were framed differently and discussed with different mentalities.

Table 4.1: The bridge, the club and the two risk conceptions

		Climate case (2-degree target)	Euro case (fiscal rules)
Networks		**Bridge**	**Club**
		Science-policy divide *enhanced* by sporadic and competitive risk communication	Science-policy divide *reduced* by intensive and harmonious risk communication
Risk conception		**Social view of risk**	**Economic view of risk**
Features	expertise	The bridge ensures the involvement of different scientific methods	The club highlights the centrality of economics in standard-setting
	normality	The bridge enhances a view that risk assessment is a special process	The club supports a view that risk management is part of normal routine

Chapter 5
Cultures: Pessimism and Optimism

Communication associates closely with *persuasion*. Some commentators argue that for the purpose of risk regulation, the major function of 'risk communication' has to be persuasion, as 'active' risk communication.[1] While persuasion/education is a key theme of 'expert/lay' risk communication, it is equally important for inter-expert risk communication, especially in the process of standard-setting that requires a consensus among experts. In my case studies, experts were trying to convince each other through scientific evidence, policy orientations or other rhetorical means. This persuasive risk communication, however, was achieved through different routes: in the climate case, experts stressed potential dangers of climate change in order to send out a warning; in the euro case, they concentrated on possible benefits of monetary integration in order to realise the single currency. This chapter will discuss these two different cultures of inter-expert risk communication — *pessimism* and *optimism*.

By 'culture' I mean 'a particular world of beliefs and practices associated with a specific group'.[2] A cultural perspective of inter-expert risk communication therefore draws attention on experts' conceptualisation of risk. It is closely linked with the risk conceptions adopted by experts, as well as their rationales, strategies and languages about risk. Cultures, of course, are situated in and influenced by networks of risk communication discussed in the previous chapter. But they are not simply products of these networks. Risk communication cultures are collective ways for experts to think and talk about risks in relation to setting risk regulation standards. The two different

[1] Carlo C Jaeger and others, *Risk, Uncertainty and Rational Action* (Routledge 2001).

[2] Susan S Silbey, 'Legal Culture and Cultures of Legality' in John R Hall, Laura Grindstaff and Ming-Cheng Lo (eds), *Handbook of Cultural Sociology* (Routledge 2010) 470.

cultures, pessimism and optimism, can be understood as 'cognitive scripts' that lead to the formation of the paradigmatic social/economic views of risk, in particular in terms of how experts characterise risk vis-à-vis the administrative routine (the 'normality' of risk), how they deal with uncertainty (the 'probability' of risk) and how they picture the potential outcomes (the 'impact' of risk).

In other words, a cultural perspective can demonstrate how an initial view of risk is turned into an entrenched risk conception, through the path dependent process of inter-expert risk communication. It has to be noted here that the risk communication culture that I am discussing should not be confused with the notion of 'culture' in the cultural theory of risk, nor other psychology studies that sometimes use 'culture' to explain different risk perceptions among different groups. In their seminal book *Risk and Culture*, Douglas and Wildavsky describe how culture, as 'group' and 'grip' of society, shapes public debates and movements about environmental risk and policy.[3] Research of risk perception has also started to include the cultural perspective into their analysis.[4] Yet unlike these studies that focus primarily on the views of lay people, my research seeks to examine the culture of risk communication among professional groups, as different epistemic communities. To reiterate, by looking at the cultures of inter-expert risk communication in the two case studies, this chapter will show how divergent cultural practices of risk communication (pessimism and optimism) further enhance the two divergent risk conceptions (the social and the economic views of risk).

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[3] Mary Douglas and Aaron Wildavsky, *Risk and Culture: An Essay on the Selection of Technological and Environmental Dangers* (University of California Press 1983). For more detailed examples: Mary Douglas, *Risk and Blame : Essays in Cultural Theory* (Routledge 1992).

[4] Paul Slovic, 'Perceived Risk, Trust, and Democracy' (1993) 13 Risk Analysis 675; Dan M Kahan and Donald Braman, 'More Statistics, Less Persuasion: A Cultural Theory of Gun-Risk Perceptions' (2003) 151 University of Pennsylvania Law Review 1291; Ortwin Renn, *Risk Governance: Coping with Uncertainty in a Complex World* (Earthscan 2008) 118–130.

I will first introduce a common belief in the power of persuasion in both cases, facilitated by results-driven and policy-oriented risk communication (Section 1). Then I will discuss the two cultures of inter-expert risk communication separately: in the climate case, a special 'getting-heard' mentality among experts that framed risks negatively had led to pessimism (Section 2); in the euro case, a strong 'make-it-work' mentality was guiding experts to frame risks positively with optimism (Section 3). Finally, I argue that the two different cultures, through the path dependent nature of risk communication, can strengthen the two divergent risk conceptions adopted by experts (Section 4).

1. From Policy-Oriented Risk Communication to Persuasion

In both case studies, experts were communicating risk in a 'results-driven' manner. When an action is results-driven, it means that the actor is focusing on outcomes and prioritises the effectiveness of that action. By saying inter-expert risk communication is results-driven, I mean that discussions about risk in my case studies were mostly *policy-oriented*, and actors were concentrating on *persuasion*. But instead of looking at persuasion in a linear sense, in the context of risk regulation standard-setting, persuasion is actually a two-way process, where experts seek to convince each other and reach consensus based on evidence, arguments and compromises.

One might argue that discussions about risk of climate change or the stability of EU/national economy can be of course related to policy, as research in these fields tends to have strong policy implication, hence 'policy-relevant'. However, there is a difference between policy-oriented and policy-relevant. A discussion about risk is 'policy-oriented', when actors are *actively* acknowledging public policies as their key

objectives for risk communication. In other words, the purpose of risk communication *is* policymaking, and the primary audiences are policymakers. While this may seem obvious in the euro case, it is less so in the climate case.

Let us start with the obvious. The discussions about the fiscal rules and the risk of macroeconomic instability in the EMU are deeply entangled with the negotiation of the Maastricht Treaty. The Delors Report stated clearly that a certain type of fiscal coordination is needed, in order to achieve the EMU.[5] Experts discussed the criteria of excessive deficits for the purpose of creating a single currency. They were fully aware of their ultimate objective, from the beginning of the debate in 1989, as the Monetary Committee (MC) reported:

> An intergovernmental conference will have to be convened at some point, if a true EMU has to be established. However, a great deal of preparatory work, notably on matters of fiscal and general economic policies, still has to be done if the conference is to be launched with a fair chance of success. Without this groundwork the conference would lack the basis it needs.[6]

The discussion about fiscal rules was the preparatory work for the EMU negotiation. Moreover, as introduced in the previous chapter, the discussion about the EMU took place in a closed network (the *club*) where there was no clear distinction between expertise and policymaking. Policymakers were thus the main audiences as well as actors of risk communication. Inter-expert risk communication regarding the fiscal rules is always about European monetary integration and policy-oriented.

The same argument is less straightforward in the climate case. This is due to the *bridge* network of risk communication discussed previously — there was a tendency for experts involved in climate change negotiation to distinguish 'pure scientists' from

[5] Committee for the Study of Economic and Monetary Union, 'Report on Economic and Monetary Union in the European Community (Delors Report)' (European Communities 1989) paras 11–12 and 30.

[6] MC, 'The Chairman's report to Ministers on the Monetary Committee's first discussion of the Delors Committee's report' (17 May 1989) II/02847, 6

'policymakers' and to emphasise the role of 'boundary organisations' as interfaces or bridges.[7] As a key expert in the field noted, the 2-degree target is a way 'to decide politically what kind of risk we are willing to accept.'[8] Acceptability of climate risk is considered 'value-laden' and should be judged 'politically'.[9] To this end, scientific risk assessment can be 'policy-relevant', but not policy-oriented or results-driven. Science should be objective, not prescriptive.

Paradoxically, it is precisely this orthodox view of science-policymaking that allowed risk communication regarding the 2-degree target to be policy-oriented. There is a general awareness that while the role of science is to inform policymakers, standards such as the 2-degree target are essential for public policy debates. Many experts thus interestingly acknowledged that although the target was not purely 'scientific', it was still a 'good' target for policymaking. As one expert worked in the then European Environment Agency Task Force commented, 'this 2-degree value is not strongly based on any scientific understanding or analysis, but just a kind of simple trick to guide the discussion.'[10] Another scientist working in academia but participating actively in the climate change debate also considered the target not scientific, yet 'a good guideline for politicians.'[11] In fact, research suggests that the 2-degree target is a 'boundary object' between science and policymaking,[12] and several interviewees also described various EU/national scientific advisory bodies as

[7] David H Guston, 'Boundary Organizations in Environmental Policy and Science: An Introduction' (2001) 26 Science, Technology, & Human Values 399.

[8] Interview with CM (10 July 2013).

[9] Bert Metz, *Controlling Climate Change* (CUP 2010); Michael Oppenheimer, 'Defining Dangerous Anthropogenic Interference: The Role of Science, the Limits of Science: Dangerous Anthropogenic Interference' (2005) 25 Risk Analysis 1399.

[10] Email from SK to author (30 January 2013).

[11] Interview with KS (29 August 2013).

[12] Beatrice Cointe, PA Ravon and E Guérin, *2˚C: The History of a Policy-Science Nexus* (IDDRI Working Papers 2011).

'boundary organisations'.[13] For them, risk communication in relation to the making of 2-degree target is mainly for the purpose of policymaking.

A closer look at the three sources of the 2-degree target (EU experts, the Dutch group and the German group) can further reveal how inter-expert risk communication in the climate case was focusing on policy needs. At the national level, Dutch and German experts provided most of the scientific foundation of the 2-degree target. Albeit being mainly 'scientific', their assessments of climate risk were very much policy-oriented, aiming at promoting the use of global mean temperature as a target for climate sensitivity, which will facilitate negotiation at the global level. This is not only confirmed by experts who participated in these Dutch and German institutions,[14] but also can be observed by looking at papers published by these experts.[15]

This phenomenon is even more evident at the EU level. The work of the EU 'climate expert group' (ad hoc expert group on climate) provided the basis of the discussion in the Council and directly contributed to final adoption of the 2-degree target. According to archival data, Council conclusions related to climate change were first discussed and drafted by this expert group.[16] It was also stated explicitly in the June 1995 Council Conclusions that the EU expert group should work on preparing

[13] Interviews with ES (2 September 2013), CM (2 April 2014) and KX (1 April 2014).

[14] Interviews with Dutch experts: SS (31 March 2014), KX (1 April 2014), AI (28 August 2013) and CM (2 April 2014); with German experts: KT (30 September 2013), GF (28 August 2013) and UG (1 October 2013).

[15] For example: RIVM, *The Environment in Europe: A Global Persepctive* (RIVM 1992); WBGU, 'Scenario for the Derivation of Global CO2 Reduction Targets and Implementation Strategies' (WBGU 1995); Frank R Rijsberman and Rob J Swart (eds), *Targets and Indicators of Climatic Change* (Stockholm Environment Institute 1990); Hans Joachim Schellnhuber, 'Tragic Triumph' (2010) 100 Climatic Change 229.

[16] Council of the EU, 'Preparation for the Environment Council meeting on 22 and 23 June 1995' (2 June 1995) 7716/95; Council of the EU, 'Preparation of Environment Council meeting on 18 December 1995: Community strategy on climate change – Council conclusions' (5 December 1995) 12407/95; Council of the EU, 'Working document: Community strategy on climate change – Draft Council conclusions' (22 May 1996) SN/2796/96.

the EU position for the negotiation of a UNFCCC Protocol.[17]

A key boundary organisation, the European Environment Agency (EEA), was also policy-oriented and mentioned the 2-degree target in passing. In 1995, the EEA Task Force (EEA-TF) published the pan-European *Dobris Assessment* report,[18] and later in the same year the *Environment in the European Union* report.[19] Both reports were clearly meant for environmental policymaking. A document reviewing these two EEA-TF reports also supports this observation.[20] This internal review states that both reports have targeted policymakers as primary audience; it also analyses that the Environment in the EU report was even more policy-focused than the pan-European Dobris Assessment, because the EU had a much clearer overall structure for environmental policy.[21]

Moreover, both reports of the EEA-TF have one special chapter dedicated to climate change. The decision to have a chapter on climate change was in itself also policy-oriented: it was based on an exercise of prioritising 'issues' that required action at the (pan-)European level. A senior expert who was in the EEA-TF at the time recalled that these two reports were regarded as great opportunities 'to feed the policy process' and 'for the Agency to be seen at the table'.[22] According to her, the fact that the Dobris report mentioned the 2-degree target clearly reflects the need for a tool to guide climate debate at the global level:

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[17] Council of the EU, 'Community strategy on climate change – Council conclusions' (30 June 1995) 8652/95, para 7.

[18] EEA, *Europe's Environment: The Dobris Assessment* (EEA 1995).

[19] EEA, 'Environment in the European Union: Report for the Review of the Fifth Environmental Action Programme' (EEA 1995).

[20] Environment Resources Management, 'Evaluation of the Dobris Assessment and Environment in the European Union' (ERM, February 1997).

[21] ibid 1-2, 21-22.

[22] Interview with ES (2 September 2013).

> The whole thing happened because of the real need to engage, get some targets and the *desperation*. I can still recall the desperation at the time [before Kyoto] … I think there was a sense of trying to make something simple and [2-degree] was a standard bearer. I might be recollecting wrongly here, mixing things up, but it was part of the mix to say: 'We got to really get to an agreement to reduce the CO_2 emission. How do we do it?' This is all part of that mix.[23]

EU policymakers desperately needed a standard to facilitate climate negotiation, and the experts provided them with the 2-degree target.

Therefore, in both cases, experts were communicating risk for the purpose of policymaking. Moreover, as the above quote suggests, this is not only a one-way process as 'science to policy',[24] but also a two-way dialogue, as many experts were communicating and 'repacking' risks in response to policymakers. I will discuss this further throughout this chapter. In short, policy-oriented risk communication means that instead of merely transmitting messages about risks passively, actors need to actively *persuade* others. Experts were thus focusing on the persuasive power of risk communication — they constructed and framed messages related to risks for the purpose of persuasion.

Yet this persuasive power is precisely where the culture of risk communication diverges in my two case studies. 'Risk communication as persuasion' was achieved with very different mentalities: in the climate case, experts were trying to get the scientific messages of climate risk across and convince the politicians (*getting-heard*); in the euro case, they were concentrating on forging a consensus on macroeconomic risk management and realising the euro project (*make-it-work*). These two mentalities of risk communication were further strengthened by negative and positive framing of risk, and eventually evolved into two different risk communication cultures, which I

[23] ibid (emphasis added).

[24] Jasanoff also criticises this simplified understanding of scientific advisory: Sheila Jasanoff, *The Fifth Branch: Science Advisers as Policymakers* (Harvard University Press 1998).

labelled as *pessimism* and *optimism*. In the next two sections, I will explain how pessimism and optimism operated in the climate case and the euro case, respectively.

2. Climate Case: Pessimism

I argue that in climate change, the culture of 'risk communication as persuasion' can be understood with reference to the notion of *pessimism*. This might sound a bit confusing at first glance, because one needs to be 'active' in order to 'persuade'. However, a pessimistic culture of risk communication does not mean that actors are 'passive' or 'disappointed' with risk communication. It is not that experts failed to communicate risk, quite the contrary — they effectively communicated risks through a pessimistic voice. This is 'persuasive pessimism'.

The pessimism embedded in the discussion of the 2-degree climate target can therefore be understood through two separate but interlinked perspectives: experts were communicating with a strong desire to get their risk messages heard, and they were framing risk negatively for effective risk communication, partly because of the fact that the audience were more receptive to pessimistic messages.

2.1 Getting-heard

Experts in the field of climate change wanted their voice to be heeded. This mentality of 'getting-heard' in climate public policy is not only about translating scientific evidence into understandable language, but more importantly, it is about persuading policymakers that climate change is a pressing issue for action. The 2-degree target was designed to *make the case* of climate change in public policy.

Reports generated by those so-called boundary organisations (i.e. the IPCC, the

EEA and many other national science-policy institutions) are translating scientific findings into messages that can inform policy actions. While some organisations stress that their works are policy-relevant but neutral (such as the IPCC)[25], others are more explicit with their intentions to be policy-oriented (such as the RIVM and the WBGU). Either way, 'translation' of scientific risk assessment is the key to bring knowledge across the imaginary divide between 'science' and 'policymaking'.

For experts working in boundary organisations, their role is to synthesise, bridge and translate.[26] A senior expert in the EEA further explained how this works:

> How do you get scientists to better communicate? You need to create some boundary organisations to help translate. … It creates the space where you can have this translation happening. Because if you don't have that, you have the scientists up against the politicians and they speak different languages. By having a boundary organisation, you create a wedge, a space in which you process both the political questions and the scientific answers or findings. It simply creates space. It's a resource that allows dialogues to happen.[27]

This strategy of creating a space for dialogues between scientists and policymakers was also used by key national actors, namely the Dutch National Institute for Public Health and the Environment (RIVM) and the German Advisory Council on Global Change (WBGU). The Dutch RIVM organised a series of workshops from 1995 to 1996 (the Delft process) that allowed scientists to receive feedback directly from users of climate models.[28] The WBGU also provided a direct channel for scientists in

[25] As the IPCC website emphasises, their work is 'policy-relevant and yet policy-neutral, never policy-prescriptive': IPCC, 'Organization' <https://www.ipcc.ch/organization/organization.shtml> accessed 15 June 2015.

[26] Interviews with ES (2 September 2013), AI (28 August 2013), GF (28 August 2013), SK (6 September 2013) and DK (30 September 2013).

[27] Interview with ES (2 September 2013).

[28] C Els Van Daalen, Wil AH Thissen and Marcel M Berk, 'The Delft Process: Experiences with a Dialogue between Policy Makers and Global Modellers' in Joseph Alcamo, Rik Leemans and Eric Kreileman (eds), *Global Change Scenarios of the 21st Century: Results from the IMAGE 2.1 Model* (Elsevier 1998).

Germany to advise the Ministry of Environment.[29] However, as another expert who worked for the EEA-TF argued, simply allowing dialogues was perhaps not enough:

> There was a push to have this communication between the research and the politics. … There were a lot of hand-waving. We all do that. But we know that politicians were not really able to listen or to understand, because their language is completely different.[30]

Although the interviewee was not able to explain exactly what 'language' was needed, this comment suggests that in order to get the message across, experts had to do more than just talking to each other. It also implies that scientists need to eventually learn the political/policy language (note that interviewees with a pure science background often use 'policy' and 'politics' interchangeably), in order to communicate effectively. A climate scientist who is very active in the climate policy debate concurred:

> I recognise that it's necessary sometimes to leave some of the detail out. There are a lot of scientists that don't recognise that. […] While you should never compromise your science from the political or the user end, *packaging* actually probably should be defined by the user. […] We like to say that our research is policy-relevant, not policy-driven. My argument is that it's not policy-driven, if policy is allowed to say how they would like it packaged.[31]

For her, packaging scientific findings for public policy purposes does not necessarily compromise the science (although what she did was indeed 'policy-driven'). This quote also points out some key elements of political/policy language, i.e. leaving out some details and identifying the needs of policymakers. One can find a balance for this 'packaging' or 'translation' of science for the purpose of risk communication. A good translator must speak both languages.

In fact, this is a common practice of many scientific synthesis reports.[32] In terms

[29] WBGU, 'Serving Global Change Politics' (WBGU 2013); WBGU, 'Scenario for the Derivation of Global CO2 Reduction Targets and Implementation Strategies' (n 15); Schellnhuber (n 15).

[30] Interview with SK (6 September 2013).

[31] Interview with KS (29 August 2013).

[32] For example the IPCC 'Summary for Policymakers' (SPM): IPCC, 'Climate Change 2001:

of my case studies, papers of the RIVM and the WBGU demonstrate clearly how such kind of translation can be done. As introduced in Chapter 3 (Section 1.2), Dutch scientists developed a so-called 'traffic light system' to translate several climate indicators into straightforward visual signals: if global mean temperature rise above 1°C, it is a yellow light warning, meaning 'extensive damage to ecosystems'; if it goes beyond 2°C, then it is a red light, meaning 'social and economic disruption', a no-go zone.[33] Following the traffic light system, the Dutch group organised the Delft workshops, which invited many policymakers and co-developed the 'safe landing analysis'.[34] This practice has shown policymakers what emission pathways were required to keep the planet safe in the area of green or at least yellow light. As a former RIVM official noted:

> In the Netherlands we felt it would be helpful if we could translate [scientific findings] into a political limit. We came up with the idea of this 2-degree limit and not sticking to the concentration levels (of greenhouse gases), which people normally did, but turning it into a temperature. It was easier to communicate. Of course, picking 2℃ was built on the available insights. […] It didn't come out of the blue.[35]

Translating concentrations of greenhouse gases into temperature makes it easier to communicate risk. While I will discuss why global mean temperature was chosen as a climate target in the next chapter, here I want to focus on the persuasive power of translating science into policy language. For Dutch experts, such translation is crucial and should be done with the help of users, hence the Delft process; however, it has to actually translate science and should not be something 'out of the blue'. Using a

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Synthesis Report – Summary for Policymakers' (IPCC 2001); IPCC, 'Climate Change 2007: Synthesis Report – Summary for Policymakers' (IPCC 2007).

[33] RIVM (n 15) 28; Rijsberman and Swart (n 15); Pier Vellinga and Rob Swart, 'The Greenhouse Marathon: A Proposal for a Global Strategy' (1991) 18 Climatic Change vii, x fig 2.

[34] Van Daalen, Thissen and Berk (n 28); Robert Swart and others, 'The Safe Landing Approach: Risks and Trade-Offs in Climate Change' in Joseph Alcamo, Rik Leemans and Eric Kreileman (eds), *Global Change Scenarios of the 21st Century: Results from the IMAGE 2.1 Model* (Elsevier 1998).

[35] Interview with CM (2 April 2014).

traffic signal metaphor and several knowledge co-production workshops, the Dutch group translated and persuaded policymakers that global mean temperature was a good target for climate sensitivity.

The German story followed a rather different logic to translate scientific knowledge. Instead of using a common metaphor such as traffic lights, the WBGU proposed a special principle labelled 'preservation of Creation' and argued that humans should not go beyond the boundary (i.e. the 'tolerable temperature window') that allowed the development of our civilisation.[36] Based on paleo-climatic evidence, this tolerable window approach showed that 2°C should be the upper boundary for preservation of Creation, and if exceeded, 'dramatic changes in the composition and function of today's ecosystems can be expected.'[37] With a slightly religious connotation, this approach provided an even more straightforward argument for the 2-degree target, by defining 'dangerous' directly without using sophisticated climate scenarios, impact assessments and computer models. Schellnhuber, the co-chair of the WBGU, is apparently quite satisfied with the positive reception of his approach in the policy domain.[38]

While most interviewees agreed that the Dutch approach is a good way to translate science for policy, some considered the German approach unacceptable. Tol, in his review paper, criticises that the WBGU method is inadequate and its reasoning rather thin.[39] A scientist working in the field also showed her discomfort with the WBGU approach:

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[36] WBGU, 'Scenario for the Derivation of Global CO2 Reduction Targets and Implementation Strategies' (n 15) 7; Schellnhuber (n 15) 230.

[37] WBGU, 'Scenario for the Derivation of Global CO2 Reduction Targets and Implementation Strategies' (n 15) 12. The more detailed reasoning of the TWA was discussed in Section 1.2, Chapter 3.

[38] Schellnhuber (n 15) 231.

[39] Richard SJ Tol, 'Europe's Long-Term Climate Target: A Critical Evaluation' (2007) 35 Energy Policy 424, 426.

> My issue with that was that it would have been fine if they had used criteria to select the 2 degrees in first place that were based on impacts of climate change, or estimated impacts. But they weren't based on that. They were based on what the climate has been in the past.[40]

However, another scientist, taking a more policy-oriented stance, supported this way of risk communication and considered it 'pragmatic':

> [It was] an attempt from this German group to communicate something in an understandable way. It was a pretty pragmatic way that they found that 2°C. […] It wasn't developed by scientists as *science*. It was developed as a *tool* to communicate some really, really complicated issues.[41]

Almost all interviewees found it extremely difficult to judge *how scientific a scientist should be* in contexts of risk communication, because not only the standard of science is vague, but also the role of scientists is contested. Nevertheless, we can see a common mentality in the work of the EEA, the RIVM and the WBGU, that is to *translate scientific knowledge into messages that can be understood by policymakers*. I argue that it was this 'getting-heard' mentality that was guiding the culture of persuasion in inter-expert risk communication in the climate case. As an expert who worked in the EEA and the RIVM commented, risk communication was about 'making the case' of climate change in a public policy arena.[42]

This mentality of getting-heard was supporting a particular way of translating or repackaging scientific knowledge for risk communication — focusing on impacts. To be more specific, experts tended to focus on *negative impacts*, in order to make the case of climate risk. The IPCC's Working Group II focuses specifically on impacts;[43] the EEA's Dobris Assessment puts climate change as the first chapter of the part on

[40] Interview with TD (4 September 2013).

[41] Interview with KS (29 August 2013).

[42] Interview with KX (1 April 2014).

[43] IPCC, 'Working Group II' < https://www.ipcc-wg2.gov/index.html> accessed 15 June 2015.

'problems';[44] the RIVM states that if its traffic lights system turns red, climate change will bring 'social and economic disruption';[45] and the WBGU also argues that if we go beyond the tolerable temperature window, 'dramatic changes' in ecosystems can be expected.[46] Experts emphasised the downside of climate risk in different ways for the purpose of risk communication. This is actually not surprising, because Article 2 of the UNFCCC has clearly stated that preventing 'dangerous' climate change should be the ultimate objective of global climate policy. Therefore, it seems pretty natural that the debate about 2-degree followed this logic of communicating through 'risks' and 'impacts', as an expert from a national ministry noted:

> There has been very serious thinking about the risks and how to communicate them. […] There have been some serious attempts to come up with a number that would issue a *warning* where necessary.[47]

The case of climate risk was made by translating scientific findings into a warning. The culture of persuasion is not just about getting-heard, but more importantly, about focusing on the negatives and sending warnings.

2.2 Negative framing

Inter-expert risk communication in the field of climate change concentrates on the negative impacts that may occur in our climate system. 'Risk' is generally framed negatively in environmental policy and particularly in climate change issues.[48] Many indicators are developed (e.g. indicators on marine environment, biodiversity, water

[44] EEA (n 18) 511–512.

[45] RIVM (n 15) 28; Vellinga and Swart (n 33); Rijsberman and Swart (n 15).

[46] WBGU, 'Scenario for the Derivation of Global CO2 Reduction Targets and Implementation Strategies' (n 15) 7. See also WBGU, 'Targets for Climate Protection' (WBGU 1997).

[47] Interview with QH (6 September 2013).

[48] There are recent developments that frame 'uncertainty' more positively, such as the notions of 'sustainable development' and 'ecosystem services'.

quality, agriculture, human health, etc.) to demonstrate the impacts and vulnerability caused by climate change.[49] While negative framing of risk might seem self-evident, my main argument here is that such negative framing, together with the getting-heard mentality, have created a special *pessimistic culture* of persuasive risk communication among experts in the area of climate policy.

Experts, in fact, tend to equate 'risks' with 'impacts', and talk of 'uncertainty' as a separate issue in terms of communicating scientific assessments on climate risks. When asked about how to best communicate science, an expert commented:

> I think we have to focus much more on risk. I think people understand risk better than uncertainty. It still surprises me, with respect to climate change, that we focus so much on the uncertainty and use the uncertainty as an excuse for not doing anything. If we build a nuclear power plant, we don't ask the engineer to prove there will be an accident before we pay extra to try to limit the risk or to constrain it.[50]

The parallel of nuclear power and climate change is interesting. She seems to suggest that if the negative consequences of a risk event are well-established, the issue of uncertainty should not be an excuse of non-action. This is clearly an argument in line with the precautionary principle, as stated in the law and policy of the EU.[51]

Of course, climate scientists actually know a lot about uncertainty and complexity of climate system. The context here is that for the purpose of better 'communication', uncertainty often works against understanding, while impacts help translating clearer and stronger messages. Almost all interviewees recognised that it was very difficult to communicate scientific uncertainty. This is partly because of the

[49] For example: EEA, 'Climate change, impacts and vulnerability in Europe 2012: An indicator-based report' (EEA 2012) EEA Report No 12.

[50] Interview with KX (1 April 2014).

[51] TFEU art 191 (enshrining the precautionary principle in the area of environmental policy). In the EU regulatory practice, the principle is often used to prohibit or remove a potentially hazardous product, especially in the case of risk with scientific uncertainty. Commission, 'Communication from the Commission on the precautionary principle' (Brussels, 2 February 2000) COM(2000) 1.

complexity of 'science', but mainly due to the fact that there are other interest groups that often used scientific uncertainty to create 'doubts'.[52] I will further discuss experts' love-hate relationship with uncertainty in the context of the precautionary principle and selection of risk messages in the following two chapters. For this chapter on culture, I want to emphasise that *downplaying uncertainty* should be seen as the flip side of *foregrounding impacts*, i.e. a negative framing of risk.

Another expert associated with the Dutch group also noticed that 'the word "risk" was used very loosely. Basically, what people do when they talk about risk is to talk about potential impacts.'[53] She also added that if experts follow a standard definition of 'risk = impact × probability', they actually cannot say much.[54] Communicating risk loosely by focusing on impacts is much more powerful to get the message heeded.

A closer look at those papers drafted by boundary organisations can provide a better picture of how negative consequences were emphasised in the climate debate. In the WBGU's 1995 report that proposed the tolerable window approach, it emphasises that its scenario is special, because '[u]nlike most other approaches, this scenario is not based on the causes but on the *effects* of climate change', which specifies 'tolerable stresses for humans and nature'.[55] In the paper presented by the Dutch group on the traffic lights system, it states that once in the 'red zone' (i.e. 2℃ above pre-industrial level and sea level rise above 50 cm), we are likely to face 'extensive damage to ecosystems' and a much larger 'risk of non-leaner responses in

[52] Interviews with BN (16 August 2013) and CM (2 April 2014).

[53] Interview with SS (31 March 2014).

[54] ibid.

[55] WBGU, 'Scenario for the Derivation of Global CO2 Reduction Targets and Implementation Strategies' (n 15) 3–4 (original emphasis).

the climate system'.[56] Although both papers represent some uncertainties and limits in science, they seek to focus on the negatives of climate change impacts.

However, framing risk negatively does not mean experts are 'alarmists' who operate on inflated negative languages without sound scientific proofs.[57] While appreciating that negative framing of risk help translating messages, an expert worried that this might be problematic and need a better balance:

> They tend to focus on the bad things. So that means you focus on impacts, negative impacts primarily. […] Personally, I think that usually they're really not exaggerating, but they're selectively choosing the more negative thing to make a point.[58]

Scientists concentrated on the downside of climate risk in order to make a point, to make the case of climate policy. This shows how the mentality of getting-heard is deeply linked with the negative framing of risk. Discussions about climate impacts trigger more policy actions, as an expert working in the ministry noted:

> It's useful to discuss what impacts are dangerous, what it is that we want to avoid, so what does it tell us about necessary mitigation and so on. […] I suppose the origin, in terms of warning, [messages like] 'hey, there's a big risk out there! We're doing something that leads to something potentially very dangerous!' I guess that early warning was in the beginning very science-driven.[59]

It might seem 'science-driven' from a policymaker's point of view, but for scientists, focusing on the negatives was just a user-friendly way of 'packaging' risk assessment. Both scientists and policymakers contributed to the development of a pessimistic culture of inter-expert risk communication, which led to the adoption of a 2-degree target, as another official recalled: 'I think we were all at the time convinced that 2

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[56] Vellinga and Swart (n 33) vii–ix.

[57] James S Risbey, 'The New Climate Discourse: Alarmist or Alarming?' (2008) 18 Global Environmental Change 26.

[58] Interview with SS (31 March 2014).

[59] Interview with UG (1 October 2013).

degree increase in temperature is the maximum, in order to avoid serious negative impacts.'[60] Climate impacts in general, and the 2-degree target in particular, have become the common language shared by science and policymaking.

Labelling the culture of climate risk communication as *pessimism* might sound like a criticism, but I am by no means criticising the science, at least not for the purpose of risk communication. As argued earlier, there is a difference between pessimism and alarmism. Climate scientists repackaged scientific findings with a negative stance due to an anticipation of more policy responses. 'We realised then that the 2-degree thing was quite simple, but it might be good enough just to push action, so we in a sense went along with it.'[61] Experts were reflexive. Instead of being extreme activists, they were constantly striking a balance between rationale and action, between scientific evidence and other values.

Pessimism as culture of inter-expert risk communication is a mix of many things: getting one's voice heard, downplaying uncertainty, translating science and focusing on impacts. The following quote summarises this culture in an interesting way:

> Risk communication between experts? That was basically in terms of impacts of climate change. […] Basically it was a matter of looking at what kind of impacts certain increase in temperature would create. […] We never went very deeply into the scientific issues because it's a combination of a number of things. It was always a sort of more aggregated picture of risk that has driven the discussion. So you aggregate different impacts into a level that has never been quantified. It has never been considered specifically certain; it was not considered separately. It was an *aggregated risk picture*. That was the discussion.[62]

Therefore, a pessimistic culture, constituted by negative framing and getting-heard mentality, should not be understood as something 'bad'. It is just a way to provide an 'aggregated picture' of climate risk for persuasive risk communication. While the case

[60] Interview with JI (25 August 2013).

[61] Interview with ES (2 September 2013).

[62] Interview with CM (10 July 2013).

of 2-degree climate target demonstrates the persuasive power of pessimism, risk communication in the euro case shows an opposite way of communicating risk through optimism.

3. Euro Case: Optimism

Contrary to the pessimistic culture, experts discussed the risk of the EMU with a strong sense of *optimism*. I argue that the culture of inter-expert risk communication is particularly 'optimistic' in the euro case, because experts associated the persuasive power of risk communication with the whole euro project and focused on the potential benefits or opportunities of the future EMU.

However, this culture of 'persuasive optimism' does not mean that experts focused only on the positives and did not discuss any 'risk'. Quite the contrary, they were using optimism to convince themselves that their debate about the risk of the EMU was sound and comprehensive. The optimistic culture of the negotiation on the EMU fiscal rules can therefore be analysed from two intertwined perspectives: experts had a strong desire to make the euro project work, and to this end, they framed risks of the EMU positively during the discussion.

3.1 Make-it-work

Experts who participated in the euro project tend to have strong beliefs in European integration in general and the EMU in particular. Some connected this belief in a personal, emotional way, like one economist who joined the team when the CoG (Committee of Governors of the Central Banks) was still based in Basel recalled:

> Following the Delors Report, I went, with other people, to Basel. We moved to Basel with the feeling that we were starting a long journey toward the creation of a single currency. That was an absolutely exciting feeling. […] It was an extraordinary experience, because a new team of economists was set up, all detached from their own countries to work on a truly European project.[63]

The creation of the EMU was undoubtedly a great milestone of European integration. Almost every expert I interviewed showed their personal excitement about being part of a critical historical moment, and for many senior experts at that time, this belief was further enhanced by the political ideal that European integration was essentially a peace-keeping project:

> These were people who remembered more about what we got in the war. I think that was a lot fresher, even for people who were heads of states at the political level, who were thinking more about what we have got in the past. There was a general feeling that we really need to do this (for peace-keeping), which has somehow been forgotten today. They were certainly much more committed.[64]

Therefore these experts, with their personal passion, fresh memories of the war and a sense of mission for the common good of Europe, also demonstrated some strong personalities in risk communication. Many interviewees, as junior officials in the back row, described the members of the MC and the IGC as 'strong characters' or 'very powerful intellectuals', and the meetings as a 'second education'.[65] Several names, among others Han Tietmeyer, Jean-Claude Trichet, Nigel Wicks and Mario Draghi, were constantly mentioned by many interviewees as 'big people', but perhaps the key pusher of the EMU project was still the Commission:

> The vision for an EMU was a vision held by our President, Jacques Delors. He was the strongest President that we have had, since then there was nobody like him. He drove the [EMU] as much as at the Commission level as at the Member States level. He was a very good negotiator, and he

[63] Interview with PQ (8 April 2013).

[64] Interview with NM (16 April 2013).

[65] Interviews with JC (6 April 2013), NM (16 April 2013) and LQ (27 June 2013).

made sure that we had whatever we needed to carry the project through.[66]

From the President of the Commission to the Alternates of the Monetary Committee, experts were highly determined to make the EMU project work.

With this 'make-it-work' mentality, the Club (i.e. the Monetary Committee and the Commission) focused on the bigger picture (the success of the EMU). Discussion about macroeconomic risk in a monetary union became technical details, and experts believed that these issues had to be treated pragmatically. A strong sense of pragmatism at the technocrat level reflects the make-it-work mentality of inter-expert risk communication in the euro case. This pragmatic approach can be traced back to the very beginning of the EMU debate, as noted in an internal MC minutes in 1989:

> Szasz drew the conclusion that politicians were concentrating too much on how beautiful EMU could be in the future. It was the duty of the [Monetary] Committee to remind Ministers that the basis of the future was the present good functioning of the EMS.[67]

Experts were drawing on their daily experience with the 'imperfect' EMU, and thus envisioning an EMU that 'works', rather than a 'perfect' or 'beautiful' EMU. A pragmatic approach established at the early stage of the euro project had influenced the risk communication of the fiscal rules.

Other examples of pragmatism can be found in discussions related to the transition between different stages of the EMU. On the timing of entering into Stage 2 (which required a certain degree of convergence in budgetary performance between Member States), the MC unanimously agreed that 'a "multi-speed" process was unavoidable, although undesirable.'[68] This was in line with the pragmatic principles

[66] Interview with NM (16 April 2013).

[67] Commission, 'Short minutes of Monetary Committee of 23 November 1989' (27 November 1989) II/06906, 1.

[68] Commission, 'Minutes of Meeting of the Monetary Committee 24/4/90' (27 April 1990) II/02556, 5.

of 'parallelism and gradualism',[69] which basically suggested that most potential instability of a full monetary union would be naturally resolved by a slow but steady progress in terms of economic integration.

In other words, as long as the EMU project kept moving forward in a stable manner, everything will be fine. This is the logic of the make-it-work mentality. It transforms risks *of* the project into discussions about risks *to* the project. On the core issues about the design of the fiscal rules, the MC considered it merely as 'seeking a workable compromise on the issue of criteria',[70] instead of a critical review of potential risks of the future EMU.

Experts, of course, do not agree that they failed to discuss any risks related to monetary integration:

> In my view, risk communication at that time was well conducted in the sense that I think we analysed many aspects of *how this project could go wrong*, what it would take to *make it work*, and we also discussed the risks with the existing rules that we were close to agreeing toward the end. So it was not that we did not see risks or debate risks. It was mainly I think, on certain points, we misjudged. It was an error in judgement when it came to certain risks of the risk assessment. […] It was definitely not that everybody wanted the euro and you just go for it. That's definitely not the case.[71]

Yet this is exactly the trick of the 'make-it-work' mentality. Experts were convinced that they had examined all risks associated with the EMU project, but they were not able to go beyond the scope of the project and critically assess 'risk'. With hindsight, experts say that they 'misjudged', 'left blind spots'[72] or were 'too narrow'.[73] The desire to push the EMU forward had convinced experts that macroeconomic risks are

[69] ibid 4.

[70] Commission, 'Minutes of Monetary Committee, 16/17 April 1991' (22 April 1991) II/02302, 3.

[71] Interview with HG (27 August 2013).

[72] Interview with LQ (27 June 2013).

[73] Interview with NW (11 March 2013).

fully examined through negotiating the technicalities of the EMU.

The make-it-work mentality was at its strongest and most prominent form, when it came to the issue about timely delivery of the EMU project. This is clearly shown in the reports and minutes of the MC before the eve of the Maastricht Summit:

> As indicated at the last meeting, the Chairman considers that the meeting of 30 September has a special nature, in that the Committee *has to reach agreement* on the key points of the excessive-deficit procedure. A large area of common ground already exists.[74]

It explicitly stressed the importance of having a consensus before the deadline for the Maastricht Treaty. This 2-page note listed all 'outstanding issues' in a simplistic way, and proposed possible conclusions based on existing 'common ground'. Clearly, efficiency was the primary concern here, and the official minutes of the MC also emphasised the critical role of the MC in the whole discussion about the risk and control of excessive deficits, in order to offer the guidance to the IGC.[75] In fact, the discussion was indeed guided with a very strong intension to 'make things work':

> The Chairman began by re-emphasizing his view that it would be difficult to achieve EMU if an excessive deficits procedure were not defined in watertight terms. There could be no further delay in reaching agreement.[76]

Adopting the make-it-work mentality ensured the final delivery of the EMU project, accelerated the process of risk communication and constrained the scope of risk assessment. Experts were persuaded by this mentality that 'risk was not such an urgent concern at the time'.[77] They shared a strong desire of achieving positive results out of inter-expert risk communication, but as an expert in the Commission

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[74] MC, 'Outstanding issues on the excessive-deficit procedure' (Brussels, 20 September 1991) MC/II/419/91, 1 (emphasis added).

[75] MC, 'Draft minutes of the 383th meeting of the Monetary Committee' (Brussels, 3 September 1991) MC/II/392/91-EN.

[76] Commission, 'Short minutes of Monetary Committee, 30 September 1991' (4 October 1991) II/05112, 2.

[77] Interview with MT (27 August 2013).

acutely pointed out, when looking historically at risk and the EMU debate, one should probably pay attention to what was *not* communicated.[78] In the euro case, experts were not communicating the downside of risk — they were focusing on the positives of the EMU project.

3.2 Positive framing

A neutral or even slightly positive stance towards risk can be found in the literature of economics, business and finance.[79] Experts trained with reference to this educational background therefore tend to view risk as a form of uncertainty with potential positive outcomes. This is also true for economists who were involved in the discussion of the EMU fiscal rules. 'For me, risk means it can go one way, [or] it can go the other way.' A senior expert who worked in the CoG expressed her view, and also added that all these talks about financial risk in a negative sense are 'rather recent'. When further asked about the current discussion of financial risk, she commented: 'I think it's a bit like clean air. Nobody can be against sound public finance.'[80] For her, managing risk means achieving good results.

Constructing the control of risk as ensuring positive outcomes, rather than avoiding negative consequences, is a *positive framing of risk*. This might seem like just the flip side of the same coin. However, different points of departure of risk communication do have an impact on how risk is further discussed, because positive framing denotes a sense of 'optimism'. This is not at all surprising if we take the

[78] Interview with KK (27 June 2013).

[79] Aswath Damodaran, *Strategic Risk Taking: A Framework for Risk Management* (Wharton School Pub 2008); Glyn A Holton, 'Defining Risk' [2004] Financial Analysts Journal 19; Vincent T Covello and Jeryl Mumpower, 'Risk Analysis and Risk Management: An Historical Perspective' (1985) 5 Risk Analysis 103; Frank H Knight, *Risk, Uncertainty, and Profit* (Houghton Mifflin Company 1921).

[80] Interview with NS (8 April 2013).

above mentioned 'make-it-work' mentality into account. In order to realise monetary integration, the hidden assumption in risk communication of the EMU was that economic and monetary stability *can* be achieved, the only problem was *how*. The big question behind the discussion of the fiscal rules was not about how to avoid danger or problems caused by the EMU (negative framing), but how to *maintain sound budgetary policies* in the EMU (positive framing).

Therefore, different concepts of risks related to the creation of the EMU were captured through the notion of 'sound' economic and monetary policies. The SGP defines 'the objective of sound government finances as a means of strengthening the conditions for price stability and for strong sustainable growth conducive to employment creation'.[81] *Sound public finance, stability* and *sustainability* have thus become the key concepts that guided the discussion of the EMU and the fiscal rules.[82] Using these terms has signified a positive framing of risk.

For example, in the 1989 Delors Report, it was suggested that in the economic field of the monetary integration, the Community should 'impose constraints on national budgets to the extent to which this was necessary to prevent imbalances that might threaten monetary stability'.[83] The Commission, in its famous 'One market, one money' report backing the EMU project, also reaffirmed the need for fiscal discipline and iterated several times the importance of budgetary sustainability and price stability.[84] Not to mention in the MC, the two criteria of the fiscal rules were

[81] Council Regulation (EC) 1467/97 of 7 July 1997 on speeding up and clarifying the implementation of the excessive deficit procedure [1997] OJ L209/6, Preamble para (2).

[82] I should note that while the notions of 'sound environments' and 'sustainable development' are also used in the climate context, negative impacts still dominated the language of the climate debate, at least in the 1990s.

[83] Delors Report (n 5) para 59.

[84] Commission, 'One market, one money: an evaluation of the potential benefits and costs of forming an economic and monetary union' (October 1990) 44 European Economy.

named as the ‘unsustainability criterion’ (on debt ratio) and the ‘economic instability criterion’ (on deficit ratio):

> The [Monetary] Committee considered a spectrum ranging from imminent default through unsustainable snowballing of debt, and various ways in which monetary stability might be endangered, to inappropriate policy mixes and overheating. They concluded that two types of danger are relevant in this context:
> a) deficits producing unsustainable stocks of public debt […];
> b) deficits of a size that could endanger monetary stability […].[85]

The above quote from the MC report is a perfect example to demonstrate what ‘positive framing’ of risk actually means. It does not mean that experts did not use any negative term during the discussion. Quite the contrary, as shown in the text above, communications between experts about the EMU and the need of fiscal rules were indeed about problems and caveats. However, these negative issues are debated in a wider context of ensuring sustainability, stability and sound money policy. A positive framing of risk set the agenda of the EMU debate in an optimistic direction, which echoes the make-it-work mentality of the experts. Therefore, the potential danger of excessive deficits and methods to prevent them were always understood in relation to ensuring sustainability and stability in the EMU. Numerous examples can be extracted from the archival records I collected, which often used terms such as ‘instability’, ‘unsustainability’, ‘asymmetry’ and ‘imbalance’ to evaluate fiscal rules.

Moreover, the internal minutes of the MC noted that the two big players of the EMU project, Germany and France, were both embracing this positive framing of risk and focusing on the potential of the EMU. Tietmeyer had once ‘urged the Committee to raise the fundamental problems in the paper for ECOFIN, and to stress that if we cannot maintain convergence we should not talk about monetary union’.[86] In this

[85] MC, ‘Criteria for Excessive Deficits’ (Brussels, 25 February 1991) II/476/90-EN/Rev.2, 3-4.

[86] Commission, ‘Short Minutes Monetary Committee of 18 December 1990’ (21 December 1990) II/07563, 3.

occasion he had persuaded the Chair to conclude that 'Ministers should concentrate on the need to enhance convergence to improve conditions for EMU.'[87] Later on in the fiscal rules debate, Trichet also stressed that 'the subject of excessive deficits was politically central; without a resolution of the questions involved, there could be no EMU.'[88] Both Tietmeyer and Trichet were arguing the importance of the fiscal rules for the ultimate success of the EMU. This is how the make-it-work mentality joins hands with positive framing — experts presupposed the benefits of full monetary integration, and discussed risk in the context of achieving the EMU.

Therefore, discussions of excessive deficits were embedded within the notion of maximising the opportunities of the EMU, as one senior expert who witnessed the debate acutely pointed out:

> [We] tended to think in positive terms, but we were talking about imbalance, we were talking about danger, […] we probably use the term risk, but as we always say, any risk entails an opportunity. We took a calculated risk, and we believed that the common currency would create a dynamic, that would lead Europe [forward]. That was really the view. So risk yes, but *opportunity*.[89]

Framing risks in terms of opportunity and emphasising the importance of realising the project have generated significant persuasive power and created a culture of *optimism*. However, an expert who contributed directly to the Delors Report also noted that this 'optimism of policymakers made them overlooked to some extend the risks.'[90] Although focusing on the bright side sounds appealing and optimistic, it has its own 'risk'. André Szász, the former Executive Director of the Dutch Central Bank, has captured neatly this two-faced nature of risk in the introduction of his book:

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[87] ibid.

[88] Commission, 'Short Minutes of Monetary Committee 13 March 1991' (15 March 1991) II/01624, 3.

[89] Interview with CS (27 June 2013).

[90] Interview with MT (27 August 2013).

> As a former central banker, I cannot help being aware of the risks. But there are also risks, having created such strong expectations if it is not done. And there are opportunities, too, provided we know what we are doing.[91]

Did experts know what they were doing? Were they aware of the negative/positive framing of risk? Were they aware of their different mentalities that were guiding inter-expert risk communication?

4. Persuasion, Mentalities and the Two Views of Risk

In this final section, I argue that the development of two different risk communication cultures (pessimism and optimism) further reinforced the adoption of two divergent risk conceptions (the social and the economic views of risk). As explained in Section 1, inter-expert risk communication in both cases was results-driven, policy-oriented and eventually focusing on persuasion. The culture of persuasion then evolved into persuasive pessimism/optimism, which reflected an initial view of experts towards risk and rendered the view of risk paradigmatic. Through path dependence, cultures of risk communication entrenched three features of the two divergent risk conceptions: normality, probability and impact.

Before clarifying the relations between risk conceptions and risk communication cultures, I want to emphasise again that the divergence between 'getting-heard' and 'make-it-work' mentalities can also be explained by the two risk communication networks discussed in Chapter 4, i.e. the bridge and the club. Risk communication as persuasion is about persuading *others*. In the case of climate targets, the discussion was situated in a bridge network. The 'others' to be persuaded were at the other side

[91] Andre Szasz, *The Road to European Monetary Union* (Palgrave Macmillan 1999) xiii.

of the bridge, and experts were thus focusing on sending messages of risk across the bridge. In the case of fiscal rules, the debate took place in a club network. The 'others' were other experts in the same club, and risk communication was a way to form a common position among colleagues.

Although the bridge/club network offers an explanation for the two mentalities, the divergence of persuasive culture in inter-expert risk communication is much more complex. This section will first explain how certain features of risk conceptions are strengthened by risk communication cultures, and then discuss how the two different cultures lead to the construction of two divergent views of risk.

4.1 Cultures and various features of risk conceptions

A social view of risk, as explained several times earlier,[92] imagines risk as a potential special danger and/or hazard that needs to be identified scientifically and prevented; an economic view of risk, on the other hand, considers risk as part of current project that can be managed, in order to bring potential profits. Three sets of features of these divergent risk conceptions are particularly relevant to the development of pessimism and optimism in risk communication. The first one is 'normality': in the social view, risk is something abnormal and special, hence a regulatory target; in the economic view, risk is integrated as part of the routine of project management. The second feature, linked closely with the first one, is 'probability': risk is considered inherently 'uncertain' by experts with a social view, yet deemed measurable and thus calculable by those with an economic view of risk. The third and perhaps most obvious feature related to the culture of risk communication is about 'impact': in the social view, risk is associated with negative consequences; in the economic view, risk is associated

[92] Section 1, Chapter 1 and Section 1, Chapter 2

with positive outcomes.

The first and second features of risk conception stated above (i.e. ‘normality’ and ‘probability’) link closely to the formation of getting-heard/make-it-work mentality in my case studies. In the climate debate, emission reduction policies need to be justified scientifically, by proving that anthropogenic climate change is ‘real’ and ‘dangerous’. This implies the adoption of a social view of risk, because when experts contrast climate change mitigation with the ‘business-as-usual’ scenario, they define climate change as something ‘abnormal’, uncertain and extremely complex, which requires and justifies regulatory interventions. Conceptualising dangerous climate change as a target of regulatory control means that ‘risk communication as persuasion’ operates primarily between scientists and policymakers, hence the getting-heard mentality. Moreover, being aware of the complex and uncertain nature of the climate system, experts repackaged the messages and downplayed the issue of scientific uncertainty, in order to translate languages of risk between science and policy effectively. In short, experts conceptualised climate risks as abnormal and highly uncertain issues that need special regulatory attentions, to make the case of climate change in public policy.

Risk was conceptualised very differently in the euro case. Macroeconomic risk is discussed within the context of European monetary integration. This means experts accepted an economic view of risk, and presupposed the necessity of a monetary union. Making a parallel with the risk conception of a private business can help us understand this argument: in the business world, risk management means handling risks to a firm or a business project, while the existence of a firm and the profit-seeking objective of a firm are presupposed. Conceptualising risks as ‘side-effects’ or ‘routine’ of a bigger project is thus the source of a make-it-work mentality. Focusing on the success of the project also implies that ‘risk’, albeit being ‘uncertain’, has to be

manageable and hence by definition calculable. Discussions about the fiscal rules were mainly focusing on realising the EMU, and experts sought to persuade each other through risk communication regarding the technicalities of a monetary union, in particular how 'excessive deficits' can be measured and managed.

Of course, there is essentially nothing wrong with taking a social or economic view of risk. My argument here is to point out the limits of these risk conceptions. Adopting a social view of risk in climate negotiation seems pretty natural, since risks related to the environment are often described as special, uncertain and complex. This, however, explains why it is sometimes difficult to 'internalise' externalities of the private sector in the area of environmental regulation.[93] *Anthropogenic* climate change can, and actually should, be perceived as the 'side-effect' of industrialisation and part of the 'routine' of modernisation. Yet a language that compares climate mitigation measures with 'business-as-usual' models is in fact working against the ultimate goal of sustainable development, because climate policies, in this sense, are always considered as additional restrictions on top of the business routine. On the other hand, being dominated by an economic view of risk, experts in the euro case were blinded by the make-it-work mentality and failed to critically review many 'risks' of the EMU project. While this has been already criticised with hindsight after the financial crisis,[94] had experts examined risks of the EMU more broadly and critically, they might have been able to include many criticisms that were in fact already

[93] Mark Sagoff, 'Economic Theory and Environmental Law' (1981) 79 Michigan Law Review 1393; Todd J Zywicki, 'Environmental Externalities and Political Externalities: The Political Economy of Environmental Regulation and Reform' (1998) 73 Tulane Law Review 845.

[94] For example: Kazimierz Laski and Leon Podkaminer, 'The Basic Paradigms of EU Economic Policy-Making Need to Be Changed' (2012) 36 Cambridge Journal of Economics 253; Mathieu Segers and Femke Van Esch, 'Behind the Veil of Budgetary Discipline: The Political Logic of the Budgetary Rules in EMU and the SGP' (2007) 45 Journal of Common Market Studies 1089; Paul De Grauwe, 'The Stability and Growth Pact in Need of Reform' (University of Leiden 2003) <http://www.researchgate.net/publication/237308330> accessed 7 July 2015.

available at that time.[95]

The third feature of risk conception relevant here is about 'impact', which clearly reflects the negative/positive framing of risk in my case studies. Article 2 of the UNFCCC defines the ultimate objective of climate policy as preventing 'dangerous' climate change. This means experts have adopted a social view of risk at the very beginning of the debate and thus were focusing on negative impacts. European monetary integration, on the contrary, was supported by the Delors Report and many previous attempts, arguing that a monetary union will be beneficial for European integration and EU's competitiveness in the globalised world. Experts therefore accepted an economic view of risk and were concentrating on the opportunities of the EMU. My argument here may seem obvious, but it is important to understand that the sources of the pessimistic/optimistic culture in general, and the negative/positive framing of risk in particular, are rooted in the pre-existing legacies of similar risk regulatory policies in the EU and influenced by the ongoing trajectories of risk communication.[96]

Because the commonality between 'pessimism' and 'optimism' in inter-expert risk communication is the culture of 'persuasion', negative/positive framing of risk should be understood as a key component of persuasive power. After all, risk communication as persuasion is about convincing the audience. If the audience is looking for negative impacts to justify regulatory intervention (the climate case), experts will show them the downside of risk; if the audience find positive impacts more appealing (the euro case), experts will provide more upside information. The

[95] For example: Barry J Eichengreen, *Should the Maastricht Treaty Be Saved?* (Princeton Univ Intl Economics 1992); Willem Buiter and others, 'Excessive Deficits: Sense and Nonsense in the Treaty of Maastricht' [1993] Economic Policy 58.

[96] On the historical contexts and effects of 'legacies' and 'trajectories' on inter-expert risk communication in the two case studies, see Sections 3.2 and 3.3, Chapter 3.

preference of the audience is then again determined by their initial views of risk, formulating a self-enhancing circle. Through inter-expert risk communication, an initial social/economic view of risk will eventually develop into a paradigmatic social/economic risk conception, a path dependent evolution.

4.2 Cultures and the construction of two divergent risk conceptions

Path dependence, I argue, guides the adoption of certain risk conceptions in inter-expert risk communication. The culture of persuasion (be it pessimism or optimism) in inter-expert risk communication not only reflects this path dependent evolution, but also enhances it. Because in order to be persuasive, experts need to communicate risk within the dominant framework, reinforcing the existing view of risk. The initial view of risk determines the path of risk communication.

First of all, I want to stress that the culture of pessimism and optimism is not a black-and-white dichotomy. They are floating and relative concepts derived through my comparative case studies. For example, we see today that after the financial crisis, there is a stronger discourse of tackling climate change with promoting a green economy or a 'green new deal'.[97] There is an 'optimistic' voice emerging. Similarly, the Eurozone had a very hard time during the crisis, and there is clearly a stronger critical review of the EMU today.[98] Risk communication regarding the single currency has turned 'pessimistic'. As explained earlier (Section 3.1, Chapter 3), critical junctures such as the global financial crisis can turn the direction of path dependence.

But without such an exogenous shock, what we see during the lifetime of the two

[97] United Nations Environmen Programme, 'Global Green New Deal: Policy Brief' (UNEP 2009).

[98] Paul De Grauwe, 'Crisis in the Eurozone and How to Deal with It' [2010] CEPS Policy Brief; Laski and Podkaminer (n 94); Segers and Van Esch (n 94).

case studies is a steady development of two divergent paths. For example, there were some 'warnings' regarding the EMU and the use of fixed fiscal rules in the 1990s. Some of these were studies commissioned by the Commission or even internal reports.[99] However, these voices were not heeded. They only appeared at the beginning of the discussion but were later on excluded from the debate, as an expert recalled:

> Of course there were contacts with academics as well, but they were not integrated in the group. […] Many academics were critical to the idea of a monetary union.[100]

Experts participated in the EMU project knew Mundell's 'Optimum Currency Area' (OCA) theory[101] very well. They understood that while the OCA argument could support monetary integration, the theory could also bring strong criticism to the EMU project.[102] Research suggests that some critical aspects of the OCA theory to the EMU were transformed and suppressed during the process of the 1992 negotiation.[103] While I want to stress here that the optimistic culture of persuasion has strengthened the selection of positive framing and eventually an economic view of risk, I will discuss the attenuation of negative messages in the euro case in the next chapter.

An even stronger example demonstrating path dependence can be found in the climate case. An expert reflected, with hindsight, that climate change should have been constructed as an economic issue in the first place:

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[99] For example: Commission, 'Problems of Economic Coordination: Budgetary Policy Aspects' (25 January 1990) II/007/90; Commission, 'Seminar of the Commission, Laarne, 17 February 1990: economic and monetary union' (19 February 1990) SEC(90) 366; Graham Bishop, Dirk Damrau and Michelle Miller, '1992 and Beyond: Market Discipline CAN Work in the EC Monetary Union' (Salomon Brothers Inc 1990).

[100] Interview with MT (27 August 2013).

[101] Robert A Mundell, 'A Theory of Optimum Currency Areas' (1961) 51 The American Economic Review 657.

[102] Interviews with KK (27 June 2013), CS (27 June 2013) and IN (3 July 2013).

[103] Holly Snaith, 'Narratives of Optimum Currency Area Theory and Eurozone Governance' (2014) 19 New Political Economy 183.

> Over the years, my conviction that we have actually started this problem wrongly already in 1992 has also increased. Just the way we framed climate change as an environmental problem — it was always framed as a global problem from the environmental side, so that's an environmental problem, and it was actually also taken by environmental policymakers and environment ministries. They don't have power! Not even in environmentally friendly countries. So other ministries, like the economic and finance ministries, they're very happy to delegate climate to an environment ministry, which means that they don't have to worry.[104]

She went on recalling her experience in the 1992 Rio Conference and commented that politicians were conspiring to make climate change a case of environmental policy, in order to weaken the power of the UNFCCC. Although this comments sounds like a conspiracy theory, she did explain why it is relevant to the 2-degree target:

> The reason I mentioned this 1992 conference is [because] this 2-degree target is reinforcing this idea that it's an environmental problem. So from that perspective, [2-degree] might not be very strong, because it reinforces the idea that you should adjust climate change through environmental policy, not through energy or economic policies. If you accept that this is the way it has been organised, then probably it's not going to change.[105]

Another expert also agreed that climate change should have been organised as an economic case, but then with further reflection, commented that experts really did not have many choices:

> I'm afraid it would never have gotten anywhere if we would have put it immediately in an economic context. It would be killed right away. Eventually, it is an economic issue and very much so. If you have a new issue that's not on the political agenda and you put it into an economic context where the evidence may not be solid and the economic case cannot be easily made, it's quickly killed. I think it was logical to build it as an environmental case. Over time, it has become an energy issue. It has become an economic issue. That is the only way to really solve it. You cannot solve it as purely an environmental issue.[106]

Risk conception is therefore 'sticky'. As explained in Chapter 3 (Section 3.3), the discussion of the 2-degree climate target followed the legacy of the 'critical loads'

[104] Interview with SS (31 March 2014).

[105] ibid.

[106] Interview with CM (2 April 2014).

method used in the acid rain issue. Climate change thus had to start as an environmental issue.[107] Similarly, the EMU fiscal rules were results of a long debate on monetary integration that can be traced back to the very beginning of the EU.[108] The euro is inevitably a political project that aims at building an 'ever closer union'. Risk conceptions become paradigmatic.

Inter-expert risk communication creates a self-reinforcing cycle that entrenches the dominant view of risk. In this chapter, we see how persuasive messages are added to the discussion, enhanced the initial views of risk, and constructed the two divergent risk conceptions. Key arguments of this chapter are summarised in Table 5.1. In the next chapter, I will investigate path dependence of risk communication further and explain how messages related to risk are amplified or attenuated through risk communication activities among experts.

Table 5.1: Pessimism, optimism and the two risk conceptions

<table>
<tr><td colspan="2"></td><td>Climate case (2-degree target)</td><td>Euro case (fiscal rules)</td></tr>
<tr><td colspan="2" rowspan="2">Cultures</td><td>Pessimism</td><td>Optimism</td></tr>
<tr><td>Persuasive risk communication based on the 'getting-heard' mentality and negative framing</td><td>Persuasive risk communication based on the 'make-it-work' mentality and positive framing</td></tr>
<tr><td colspan="2">Risk conception</td><td>Social view of risk</td><td>Economic view of risk</td></tr>
<tr><td rowspan="3">Features</td><td>normality</td><td rowspan="2">The 'getting-heard' mentality considered climate risks as abnormal, highly complex and inherently uncertain issues that require special regulatory attentions</td><td rowspan="2">The 'make-it-work' mentality considered risks associated with the euro as part of the normal routine of monetary integration that can be calculated and managed.</td></tr>
<tr><td>probability</td></tr>
<tr><td>impact</td><td>Negative framing focused on the downsides of climate risk</td><td>Positive framing included also the upsides of the EMU project</td></tr>
</table>

[107] Current development after the Stern Review has started to change this trend. Nicholas Stern, *The Economics of Climate Change: The Stern Review* (CUP 2007). This will be discussed further in Chapter 8.

[108] Ivo Maes, 'The Ascent of the European Commission as an Actor in the Monetary Integration Proces in the 1960s' (2006) 53 Scottish Journal of Political Economy 222.

Chapter 6
Dynamics: Amplification and Attenuation

In this chapter I will discuss the 'dynamics' of risk communication, by which I mean the amplification and attenuation of messages related to risks during the process of risk communication. My analysis in this chapter draws on the framework of social amplification of risk, in particular the notion of organisational amplification and attenuation (Section 1). I focus on how and why experts within or between institutions enhance certain perspectives of risk (amplification) while filter others (attenuation). Through the process of inter-expert risk communication, the 'dynamics' eventually highlight certain aspects of risk, which facilitate transforming risk evaluation into risk regulation standards. Amplification and attenuation work hand in hand to narrow down the scope of discussion about risk among experts in public policymaking.

In the climate case, the dynamics of risk communication were dominated by the force of *amplification*, and more specifically, by highlighting global mean temperature as an indicator of climate sensitivity. This process of amplification is linked with the scientific authority of actors (Section 2). In the euro case, the main dynamics were guided by *attenuation*, which made experts to concentrate on nominal convergence of macroeconomic conditions and sidelined critical opinions against the EMU project. Unlike the climate case, this process of attenuation is associated with the political power of actors (Section 3).

Finally, I will discuss how these two different dynamics, i.e. amplification and attenuation, contribute to the construction of two divergent risk conceptions (Section 4). The amplification, supported by *science*, leads to a stronger social view of risk; the attenuation, guided by *politics*, further entrenches an economic view of risk. The two views of risk eventually become paradigmatic through the path dependent dynamics

of inter- expert risk communication.

1. Dynamics: the Selection of Risk Messages

Dynamics, according to the Oxford Dictionaries, are 'the forces or properties which stimulate growth, development, or change within a system or process.'[1] By dynamics of risk communication, I mean something more specific, i.e. the *selection* of different messages about risks, especially through strengthening and/or weakening particular aspects of risk during the process of risk communication. In other words, looking at the 'dynamics' helps explain why certain messages are enhanced while others are filtered out through risk communication among experts. By tracing archival records, official documents and other grey literature, my empirical work reveals how such kind of enhancing/filtering of messages operated as a key dimension of inter-expert risk communication in my case studies.

The two important dynamics involved are 'amplification' and 'attenuation'. These two forces are characterised by the *Social Amplification of Risk Framework* (SARF) that is developed by Kasperson, Pidgeon, Slovic and their colleagues.[2] The SARF serves as an approach to examine 'the various dynamic social processes underlying risk perception and response.'[3] In terms of the SARF, risk amplification is a process that a relatively minor risk, as assessed by experts, becomes eventually a serious concern of the society, whereas risk attenuation indicates that a relatively

[1] Oxford Dictionaries, 'dynamics' <http://www.oxforddictionaries.com/definition/english/dynamics> accessed 16 June 2015, 2.

[2] Roger E Kasperson and others, 'The Social Amplification of Risk: A Conceptual Framework' (1988) 8 Risk analysis 177; Nick Pidgeon, Roger E Kasperson and Paul Slovic, *The Social Amplification of Risk* (CUP 2003).

[3] Pidgeon, Kasperson and Slovic (n 2) ch 1 and 13.

important risk issue can be neglected by the general public. In short, perceptions of risk are strengthened or weakened through the processes of social amplification and attenuation of risk.

One can clearly see a disjuncture in applying the SARF to my research on inter-expert risk communication. The SARF presupposes the 'gap' between expert and lay risk perceptions, while this thesis focuses only on risk communication activities *among experts*. However, the notion of amplification and attenuation characterised by the SARF can and should be understood in a broader sense, not limited to the typical case of 'expert/lay' risk perception gap. In fact, scholars developing the SARF have also recognised that there is a lack of scholarly attention to how organisations and institutions process risk information *internally*, and called for more studies in this field.[4] In this chapter, I borrow the concepts of amplification and attenuation to describe and explain how and why certain aspects of risk are strengthened in the process of inter-expert risk communication, while others are weakened.

The SARF argues that risk becomes amplified or attenuated through the processing of 'amplification stations', including what they called 'social stations' (social/cultural groups, government agencies and other organisations) and 'individual stations' (individuals' heuristics, interpretations and cognitions of risks). These social/individual stations, together with other factors such as the sources and channels of information and the behaviours of actors, contribute to the amplification and/or attenuation of risk. This framework is clearly established through the classic communication theory that analyses communication through a linear model of signal processing.[5] A particularly special claim of the SARF is that this primary processing

[4] ibid 24–26.

[5] Harold D Lasswell, 'The Structure and Function of Communication in Society', *The Communication of Ideas* (Institute for Religious and Social Studies 1948).

of risk, be it the case of amplification or attenuation, can generate secondary or even tertiary impacts, labelled as 'ripple effects' that resemble feedback loops. The ripple effect of the SARF explains why a minor risk can become exaggerated or overly concerned, or why a fairly serious risk can become eventually neglected, through a series of risk communication activities.

The SARF is an ambitious thesis. It seeks to construct an overarching analytical framework for the seriously fragmented scholarship of risk studies. Although the Framework includes various cultural and sociological aspects such as stigma and trust, the basic assumption of the SARF is still based on the psychological school of risk perception, i.e. an individual or a group's 'perception' of risk can be measured through psychological methods, in order to decide empirically whether a risk is 'amplified' or 'attenuated'. Scholars proposing the SARF argue that they are not presupposing a baseline or 'true' risk, as criticised by some commentators, but they are simply providing an analytical lens to examine the process of signal transmission in risk communication.[6] However, this 'process' of risk amplification/attenuation described by the SARF is clearly focusing on the 'quantitative' nature of risk, asking why a 'minor' risk eventually develops into a 'major' risk, or vice versa. While I do not intend to doubt the value of this quantitative-oriented approach, I do want to add that a more 'qualitative' understanding of risk conception is important, especially in the case of inter-expert risk communication. On top of asking whether various experts consider a risk 'small' or 'big', this chapter on the 'dynamics' of inter-expert risk communication will also emphasise how different aspects of risk were amplified and/or attenuated in the process of risk regulation standard-setting. In other words, I use the concept of amplification/attenuation to describe the process of 'selecting'

[6] Pidgeon, Kasperson and Slovic (n 2) 37–38.

risk-related messages and ask the following: what kinds of risk messages are strengthened and/or weakened through risk communication? What are the forces that contribute to this selection process? What kinds of risk conceptions will the two dynamics of risk amplification and attenuation construct? I will answer these questions through my two case studies in the following sections.

Therefore, the SARF and the notion of risk amplification/attenuation are mobilised here in a broader sense, covering how experts conceptualise risk qualitatively, and they are not limited to the rather simple question about whether a risk is perceived as 'serious' or not. In fact, my particularly qualitative interpretation of the SARF can further deepen the theoretical foundation of the Framework, as Slovic himself once criticised, one of the biggest challenges of the risk perception school is that its analyses only touch the surface of risk conceptions.[7] To this end, empirically in my two case studies I focus on the process of *narrowing down the discussion of risk* — for the purpose of setting risk regulation standards, certain aspects of risk are selected and further discussed, whereas other aspects fall into the background of the debate. In the climate case, *global mean temperature* became the centre of risk communication and eventually led to the adoption of the 2-degree target; in the euro case, *nominal convergence* in terms of public finance was the main focus of the Maastricht negotiation, which created the excessive deficit criteria. In the following two sections, I will demonstrate how the process of risk communication in the climate case and the euro case was dominated by risk amplification and risk attenuation, respectively.

[7] Paul Slovic (ed), *The Perception of Risk* (Earthscan 2000) xxiii, xxix.

2. Climate Case: Amplification

Foregrounding global mean temperature as a primary indicator for climate sensitivity was the result of risk amplification in the EU climate debate. In this section, I argue that risk amplification is not just a quantitative increase of perceived climate risk, but also bears a qualitative characteristic that emphasises the impacts of global 'warming'. Moreover, as I have explained briefly in the previous chapter (Section 2.1, Chapter 5), focusing on impacts also means downplaying the uncertainties of climate sciences, in order to avoid the attenuation effects of climate scepticism. Therefore, in the case of the 2-degree EU target, I argue that while many factors contributed to the amplification of climate risk, actors' strong desire for *scientific arguments* was the main driving force behind risk amplification. This can be understood in two different but interlinked parts: concentrating on the science of climate impacts rather than the effects of greenhouse gases (GHGs), and singling out absolute temperature increase as the most defining indicator of climate impacts.

2.1 From greenhouse gases concentrations to global mean temperature

Labelling the issue of climate change as 'global warming' clearly suggests that *temperature* has always played a central role in the discussion of climate risk. At the end of 19th century, Arrhenius' seminal paper has established the relations between 'carbonic acid in the air' and 'the temperature of the ground'.[8] This paper is widely cited in many policy documents to support the concept of using 'doubling of CO_2 concentrations' as a warning signal of high GHG concentrations, hence dangerous climate change. However, Arrhenius did not make such evaluation in his original

[8] Svante Arrhenius, 'On the Influence of Carbonic Acid in the Air upon the Temperature of the Ground' (1896) 41 Philosophical Magazine and Journal of Science 237.

paper — he simply showed in a table, based on his formula, estimations of changes in temperature in cases of doubling, tripling and other variation of CO_2 concentrations.[9] In fact, he did not think of 'global warming' as a negative thing at all:

> We often hear lamentations that the coal stored up in the earth is wasted by the present generation without any thought of the future […]. We may find a kind of consolation in the consideration that here, as in every other case, there is good mixed with the evil. By the influence of the increasing percentage of carbonic acid in the atmosphere, we may hope to enjoy ages with more equable and better climates, especially as regards the colder regions of the earth, ages when the earth will bring forth much more abundant crops than at present, for the benefit of rapidly propagating mankind.[10]

Clearly, Arrhenius considered global warming as some beneficial side-effects of the industrial revolution. As Weart noted in his book and website project, *The Discovery of Global Warming*, the history of climate science is complex and the concept of greenhouse effect / global warming / climate change has changed over time.[11] My research is by no means an attempt to repeat Weart's extensive historical work, but it is important to point out here, for the purpose of understanding the 'amplification' of climate risk, that 'global warming' did not bear a negative connotation at the very beginning of its discovery.

Fast forward the history to the debate in Europe in 1990, climate change was already treated very seriously and addressed in the Conclusions of the European Council as one of the 'global issues'.[12] However, the discussion was still based on explaining that increasing GHG concentrations will lead to warming:

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[9] ibid 266.

[10] Svante Arrhenius, *Worlds in the Making: The Evolution of the Universe* (H Borns tr, Harper & Brothers 1908) 63.

[11] Spencer R Weart, *The Discovery of Global Warming* (2nd edn, Harvard University Press 2008) <http://www.aip.org/history/climate/index.htm> accessed 17 June 2015.

[12] European Council, 'The Environment Imperative: Declaration by the European Council' (Dublin, 25-26 June 1990) SN 60/1/90, Annex II.

> Recent scientific assessments show that man-made emissions are substantially increasing the atmospheric concentrations of greenhouse gases and that a business-as-usual approach will lead to additional global warming.[13]

The Conclusions went on calling for limiting GHGs emission at the Community level. While this showed an early determination of the European Council to tackle climate change as a global issue, it did not explain why this 'additional global warming' would be problematic. The 'science' of climate change has been recognised, but the 'risk' has not.

After all, early studies of greenhouse effect were mainly interested in explaining glacial period cycles in the past, rather than analysing the influences of increased GHGs in the future.[14] Scientists in the late 80s have already noticed this dearth of research in climate impacts. The Advisory Group for Greenhouse Gases (AGGG), a precursor of the IPCC, through several meetings in 1987 and 1988, produced a report that focused on 'defining and identifying appropriate indicators and quantitative targets for climate change' and stressed that short-term emission targets eventually should be based on long-term environmental goals.[15] The report emphasised the importance of climate indicators:

> Such indicators could provide decisive evidence that climate *is* changing and could provide a yardstick for measuring progress in reducing the greenhouse effect. Levels of 'acceptable' emissions are typically determined by the economic, political, and technological feasibilities of achieving them rather than by the nature of the environmental and societal risks that these emissions entail.[16]

The AGGG report proposed several climate indicators based on scientific estimations

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[13] ibid 22.

[14] Weart (n 11) ch 1–2.

[15] Frank R Rijsberman and Rob J Swart (eds), *Targets and Indicators of Climatic Change* (Stockholm Environment Institute 1990) preface.

[16] ibid vi (original emphasis).

and models. Other sources suggest that the 2-degree target was actually decided over a conference dinner discussion in Bellagio, 1987.[17] In any case, the AGGG has established a common way of conceptualising climate risks, and shifted the centre of debate to the area of climate impacts. The Dutch group followed the AGGG method and later on developed a 'traffic light' system (the principle authors of the AGGG report were all Dutch);[18] the German Advisory Council (WBGU), also recognising the importance of impacts in the climate debate, proposed a similar set of climate targets (the Tolerable Window Approach) supported by a different scientific method.[19] Both proposals included '2 degrees' as a primary climate target.

These scientific advocacies and the IPCC First Assessment Report had contributed to the adoption of the UNFCCC, in particular its 'ultimate objective' in Article 2, i.e. 'stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.' This article laid the foundation of climate risk discussion, which led to a series of efforts to define 'dangerous anthropogenic interference', as discussed several times in this thesis.[20] The IPCC Second Assessment Report spent significant numbers of pages on the interpretation of Article 2 UNFCCC, producing a Summary for Policymakers (SPM) that was twice longer than the previous and later versions of IPCC SPM. In the Third Assessment Report, the IPCC further visualised the notion of 'dangerous' and thus amplified the perceptions of climate risk, with its famous

[17] Samuel Randalls, 'History of the 2˚C Climate Target' (2010) 1 WIREs Climate Change 598, 600. This is also supported by the interview with SS (31 March 2014).

[18] Pier Vellinga and Rob Swart, 'The Greenhouse Marathon: A Proposal for a Global Strategy' (1991) 18 Climatic Change vii.

[19] WBGU, 'Scenario for the Derivation of Global CO2 Reduction Targets and Implementation Strategies' (WBGU 1995).

[20] Michael Oppenheimer, 'Defining Dangerous Anthropogenic Interference: The Role of Science, the Limits of Science: Dangerous Anthropogenic Interference' (2005) 25 Risk Analysis 1399.

'burning embers' diagram.[21] In fact, by comparing the SPMs of all five IPCC reports,[22] one can see how *impacts*, especially global mean temperature increases, have gradually become key indicators and amplifiers of climate risk. In its first report in 1990, the IPCC described firstly the projected doubling of CO_2 concentrations, and then the estimated rises in global mean temperature and sea level;[23] however, in the latest fifth report of the IPCC, observed and projected warming is foregrounded as the first item of the SPM, followed by sections on the causes of climate change, impacts and extreme events.[24]

In short, the conceptualisation of climate risk has shifted from increases in GHG concentrations to changes in global mean temperature. This trend can also be seen at the EU level. Before 1992, the Commission and the Council focused predominantly on clarifying current and projected GHG concentrations for the purpose of global climate negotiation.[25] After signing and ratifying the UNFCCC, the EU focused mainly on meeting its initial commitments (stabilising CO_2 emissions at 1990 levels by the year 2000) as well as its Kyoto reduction target (a collective reduction of 8%

[21] Martin Mahony and Mike Hulme, 'The Colour of Risk: An Exploration of the IPCC's "Burning Embers" Diagram' (2012) 6 Spontaneous Generations: A Journal for the History and Philosophy of Science.

[22] IPCC, 'IPCC Overview' in *The IPCC First Assessment Report* (IPCC FAR, 1990) 51-62; IPCC, 'Climate Change 1995: IPCC Second Assessment Report' (IPCC SAR, 1995); IPCC, 'Climate Change 2001: Synthesis Report – Summary for Policymakers' (IPCC TAR, 2001); IPCC, 'Climate Change 2007: Synthesis Report – Summary for Policymakers' (IPCC AR4, 2007); IPCC, 'Climate Change 2014: Synthesis Report – Summary for Policymakers' (IPCC AR5, 2014). Note that the format of these reports changed significantly over time and therefore it is difficult to compare through quantitative content analysis.

[23] 'IPCC Overview' in IPCC FAR, 52-53.

[24] 'SPM' in IPCC AR5 (2014) 2-8.

[25] For example: Commission, 'The Greenhouse Effect and the Community: Commission work programme concerning the evaluation of policy options to deal with the "greenhouse effect"' (Brussels, 16 November 1988) COM(88) 656 final; Council of the EU, 'Elements for a Community position on a Global Climate Change Convention proposed by the Chair' (Brussels, 24 October 1991) Working Document ENV/91/76.

below 1990 levels by the year 2012 through internal 'burden sharing').[26] But besides the discussion about emission targets, expressions regarding measured and estimated warming became very quickly part of the main discourse of climate risk. The Council noted for the first time in its Conclusions in December 1995, citing the latest Second Assessment Report of the IPCC, that 'global temperatures are projected to rise by between 1 and 3.5 °C' by the end of the 21st century, bringing 'risk of significant damage and disruption'.[27] This emphasis on potential harmful warming was further developed into a normative language in the 1996 Council Conclusions:

> Given the serious risk of such an increase and particularly the very high rate of change, the Council believes that global average temperatures should not exceed 2 degrees above pre-industrial level and that therefore concentration levels lower than 550 ppm CO2 should guide global limitation and reduction efforts.[28]

As I quoted and explained previously in Chapter 3, the above paragraph has formally transformed '2°C' into a normative target that regulate GHG emissions. Here I want to emphasise that this 2-degree EU target reflects a gradual process of amplifying climate risk through a scientific characterisation of the 'impacts' (temperatures), instead of the 'causes' (GHGs) of climate change. This phenomenon can be clearly seen after the crucial 1996 Council Conclusions. Not only the Council and other EU institutions reaffirmed this target several times,[29] but the notion of '2°C' also

[26] Council Decision 94/69/EC of 15 December 1993 concerning the conclusion of the United Nations Framework Convention on Climate Change (7 February 1994) OJ L33/11; European Council, 'Presidency Conclusions' (Essen, 9-10 December 1994) Annex IV, sec VIII; Council of the EU, 'Climate change' (9 March 1995) 1932nd meeting; Council of the EU, 'Community strategy on climate change – Council conclusions' (22-23 June 1995) 7886/85; Council of the EU, 'Community strategy on climate change – Council conclusions' (3 March 1997) 1990th meeting.

[27] Council of the EU, 'Community strategy on climate change – Council conclusions' (18 December 1995) 12704/95, para 4.

[28] Council of the EU, 'Community strategy on climate change – Council conclusions' (25-26 June 1996) 1939th meeting, 8338/96, para 6.

[29] For example: Commission, 'International climate policy post-Copenhagen: acting now to reinvigorate global action on climate change' (Brussels, 9 March 2010) COM(2010) 86 final; Council of the EU, 'Climate change: medium and longer term emission reduction strategies, including targets –

proliferated into a global discourse, eventually becoming a symbol of climate risk. Although my case study focuses on inter-expert risk communication within Europe, it is important to note here that 'amplification through messages of impacts' has a profound influence on the global climate debate in general.

It is not too difficult to understand why climate risks were amplified through detailed scientific descriptions of impacts, especially the notion of 'warming', including both measured and estimated temperature increases. This is partly because that, as one expert commented, turning GHG concentrations into temperatures made it easier to communicate climate risk:

> People had many discussions regarding concentration levels. For many people that is something very opaque and not easily understandable. Moving to temperature is easier and much better. […] It is something that people understand. It is something that you can relate to impact. That is a very big advantage.[30]

By 'people', this interviewee was referring not only to lay people, but also politicians and policymakers. Some interviewees also mentioned that comparing to the rather abstract GHGs, 'people' can personally relate to the idea of 'temperature increase' and therefore understand climate risk.[31] While according to the SARF, direct personal experience with risk events can potentially be a risk amplifier,[32] in climate public policy debate, the notion of climate sensitivity is still very remote, abstract and not really triggering 'experience-based' risk perceptions.[33] In fact, experts also expressed concerns that although we can feel the temperature changes on a daily basis, the idea

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Council conclusions' (10 March 2005) 6892/05; EEA, 'Climate Change in the European Union' (EEA 1996).

[30] Interview with CM (2 April 2014).

[31] Interviews with JI (25 August 2013), JP (6 September 2013), QH (6 September 2013) and SS (31 March 2014).

[32] Kasperson and others (n 2) 184.

[33] Elke U Weber, 'Experience-Based and Description-Based Perceptions of Long-Term Risk: Why Global Warming Does Not Scare Us (Yet)' (2006) 77 Climatic Change 103.

of global mean temperature is actually not something that we can 'feel'.[34] A scientist explained:

> What you forget is that no organism lives at average temperature, [which] actually covers extremes. […] It's like having your feet in the oven and your head in the freezer. You are going to have a fine average temperature, but you have problems with the extremes.[35]

Therefore, discussions on temperature targets might have created a wrong perception of climate risk. Nevertheless, for the purpose of inter-expert risk communication, conceptualising climate risk through amplifying 'impacts' is not purely because experts can really 'feel' the risk. Temperatures and impacts are more 'understandable', meaning they are 'something you can measure' and 'be established objectively'.[36] In other words, focusing on impacts can provide more 'certainty' when describing climate risks, hence more 'understandable'.

This argument is closely associated with the 'getting-heard' mentality discussed in the previous chapter. During interviews, most experts expressed that policymakers in general had difficulties dealing with probability and scientific uncertainty.[37] With a limited scientific understanding of the complex climate system (this is particularly true in the 1990s), it is difficult to deliver a convincing message by explaining directly the science of the greenhouse effect.[38] Scientific estimations on climate impacts, on the contrary, provide a simplified way to present 'uncertainty' through a range (e.g. between 1.5 to 3 ℃) or a quantified likelihood (e.g. 95% probability).[39] The IPCC

[34] Interviews with SK (6 September 2013), KS (29 August 2013) and BN (16 August 2013).

[35] Interview with KS (29 August 2013).

[36] Interview with CM (2 April 2014).

[37] This is particularly true for interviewees with a strong academic background: interviews with BN (16 August 2013), KS (29 August 2013), TD (4 September 2013) and BK (5 September 2013); see also Section 2.1, Chapter 5.

[38] Interview with ES (2 September 2013).

[39] Interview with BN (16 August 2013); concrete examples can be easily found by looking at the

even developed a system of calibrated language to describe uncertainty.[40] In short, focusing on climate impacts confined the discussion of uncertainties to a framework that was manageable and, more importantly, 'understandable' by policymakers.

Therefore, while climate risks and impacts were amplified during the process of risk communication, the discussion about uncertainties of the complex climate system was *attenuated*, or at least, transformed into a more confined scale. This specific way of climate risk amplification was facilitated by the getting-heard mentality, because the fundamental uncertainty of climate system was often mobilised by climate scepticists to create 'doubts':

> They make use of uncertainty on the scientific side. […] They create doubt. Doubt is what helps politicians to refrain from decisions. […] Selling doubts, this is not new. We had the whole tobacco industry phenomenon. You exactly saw the same thing. There were mountains of evidence. Still, it took a long time before the politicians took the right decisions because the tobacco industry just created doubts.[41]

Facing the challenge of climate scepticism, scientists downplayed uncertainties and foregrounded impacts, in order to make the case of climate change. Experts have carefully transformed the fundamental uncertainties of the climate system into the discussions of climate impacts. The amplification of climate risk overcame climate scepticism and maintained scientific credibility.

To summarise, through the process of inter-expert risk communication in relation to the promulgation of the 2-degree EU target, risk of dangerous anthropogenic climate change was amplified. More specifically, this amplification of climate risk can be characterised as a shift of risk conceptualisation from the 'causes' to the 'impacts'

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contents of the IPCC reports and EEA papers.

[40] This was developed since the fourth assessment of the IPCC in the 2000s, and later on revised for the latest fifth assessment: IPCC, 'Guidance Note for Lead Authors of the IPCC Fourth Assessment Report on Addressing Uncertainties' (IPCC, July 2005); IPCC, 'Guidance Note for Lead Authors of the IPCC Fifth Assessment Report on Consistent Treatment of Uncertainties' (IPCC, July 2010).

[41] Interview with CM (2 April 2014).

of climate change and a special treatment of scientific uncertainties. Furthermore, I argue that such risk amplification was driven by the 'getting-heard' mentality of experts, a requirement of scientific credibility, and as explained in the following paragraphs, a two-way dialogue between scientists and policymakers.

2.2 Selecting temperature as the target: a science-policy dialogue

So far I have demonstrated that climate risks were amplified through emphasising the impacts of climate change and using global mean temperature as the prime indicator. However, it remains unclear why the EU chose to use temperature, or to be specific, *absolute increase in global mean temperature*, as its climate target. I argue that this selection was a result of a series of dialogue between scientists and policymakers, which can be explained by the 'ripple effect' of the SARF.

Why was 'absolute temperature increase' singled out as the key climate target? Some interviewees explained that this was because people can relate to temperature more easily,[42] or because it can provide a clear target that was preferred by politicians.[43] Some researchers claim that a temperature target was chosen because it represented the 'boundary object' of climate science;[44] others argue that the 2-degree target was selected as a 'focal point' for climate negotiation.[45] In addition to these explanations, I emphasise that the amplification of risk through inter-expert risk communication, especially its 'ripple effect', has contributed to the selection of absolute temperature increase as the central target of climate policy.

[42] Interviews with CM (2 April 2014) and JI (25 August 2013).

[43] Interviews with BN (16 August 2013), TD (4 September 2013) and KS (29 August 2013).

[44] Beatrice Cointe, PA Ravon and E Guérin, *2˚C: The History of a Policy-Science Nexus* (IDDRI Working Papers 2011).

[45] Carlo C Jaeger and Julia Jaeger, 'Three Views of Two Degrees' (European Climate Forum 2010) ECF Working Paper 2.

Before the adoption of the 2-degree target, there were many indicators proposed as potential benchmarks for climate sensitivities. For example, the influential AGGG report and the subsequent 'traffic light' system proposed by the Dutch group have suggested a mixture of five indicators: rate of sea-level rise, absolute sea-level rise, rate of temperature increase, absolute temperature increase and CO_2 concentrations.[46] The EEA Dobris Assessment also presented several climate indicators, including rate of sea-level rise, rate of temperature increase and absolute temperature increase.[47] The German WBGU report, which appeared later in the climate discussion, proposed only temperature targets, but still included both absolute increase and rate increase in global mean temperature in its 'tolerable window' approach.[48]

It should be noted that these policy-oriented papers did not prioritise the importance of absolute temperature increase. When asked why '2°C' was selected as *the* target, interviewees often responded that the climate target was a 'political decision'.[49] This depicts a rather simplistic picture of one-way risk communication: scientists proposed multiple options of climate risk indicators, and policymakers selected one 'politically'. While the 2-degree target was indeed formally adopted by the Council in 1996, the process of selecting climate indicators was much more complicated than 'political decisions informed by sciences' or 'speaking truth to power'.[50] By tracing official documents and grey literature, my empirical study reveals a *two-way dialogue* between 'boundary organisations' (e.g. the EEA, the

[46] Rijsberman and Swart (n 15) x–xi; RIVM, *The Environment in Europe: A Global Persepctive* (RIVM 1992) 28–33.

[47] EEA, *Europe's Environment: The Dobris Assessment* (EEA 1995) ch 27.

[48] WBGU (n 19) 5–9; WBGU, 'Targets for Climate Protection' (WBGU 1997) 13–17.

[49] Interviews with CM (2 April 2014), KX (1 April 2014), UG (1 October 2013) and QH (6 September 2013).

[50] Sheila Jasanoff, *The Fifth Branch: Science Advisers as Policymakers* (Harvard University Press 1998).

Dutch RIVM and the German WBGU) and policymaking institutions (mainly the Council, but also national ministries to a lesser extent). It was thus through this *risk dialogue*, absolute temperature increase as a central climate risk indicator was amplified and eventually selected.

The EEA and the Council interact indirectly. In 1995 the newly established EEA published two general environment reports, one on the pan-European area (the Dobris Assessment)[51] and the other focusing on the EU.[52] While only the Dobris report mentioned '2°C', both reports presented several climate indicators as ways to assess climate risks. The main audiences of these reports were national ministers and the Commission.[53] However, although experts working in the Council noted that they were aware of these report in the 1990s,[54] EEA reports were not cited in the Council Conclusions.[55] After the 2-degree target was adopted in 1996, the EEA systematically incorporated the EU target into its subsequent reports.[56] Clearly, the EEA has shaped its message in response to the positions of the Council. The EEA may have mentioned '2°C' before the Council in passing, but it was the Council that eventually drove the EEA to fully embrace the 2-degree target in its papers.

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[51] EEA, *Europe's Environment: The Dobris Assessment* (n 47).

[52] EEA, 'Environment in the European Union: Report for the Review of the Fifth Environmental Action Programme' (EEA 1995).

[53] Environmental Resources Management, 'Evaluation of the Dobris Assessment and Environment in the European Union' (ERM 1997) 43–49; EEA, *Europe's Environment: The Dobris Assessment* (n 47) preface; EEA, 'Environment in the European Union: Report for the Review of the Fifth Environmental Action Programme' (n 52) preface.

[54] Interviews with JI (25 August 2013) and JP (6 September 2013).

[55] EEA reports are rarely cited in the Council's documents. For example: 1996 Council Conclusion (n 28); Council of the EU, 'Preparation of the "Environment" Council meeting on 25 June 1996' (Brussels, 11 June 1996) 8063/96; Council of the EU, 'Community strategy on climate change – Draft Council conclusion' (Brussels 4 June 1996) 7925/96.

[56] For example: EEA, 'Climate Change in the European Union' (n 29); EEA, 'Climate Change, Impacts and Vulnerability in Europe 2012: An Indicator-Based Report' (EEA 2012); Hartmut Grassel and Bert Metz, 'Climate Change: Science and the Precautionary Principle' in EEA (ed), *Late Lessons from Early Warnings: Science, Precaution, Innovation* (EEA 2013).

The Dutch group, through the AGGG conferences and the Delft process, has built more direct connections with EU policymakers. As mentioned earlier, Rijsberman, Swart and Vellinga have already begun to propose various climate indicators since the late 1980s, under the 'traffic light' system.[57] The Delft process in 1995 and 1996 further advanced this connection, and together with participants from the EU and the Dutch ministry, the original matrix of climate indicators was refined.[58] In the 'safe landing analysis', the direct product of the Delft process, the central role of temperature was emphasised much more explicitly, compared to the previous traffic light system. The foregrounding of temperature as a key climate indicator was a direct reflection of policymakers' attitudes, facilitated by intensive communications through the form of workshops. The Delft process has clearly created a series of dialogues and amplified the importance of temperature targets.

The German story represents perhaps an even more direct form of 'dialogue' between top scientists and ministers. The WBGU joined the debate much later than the Dutch group in 1995, but it proposed a very different 'inverse' approach, seeking to define 'dangerous climate change' directly.[59] In addition to its special scientific method, the 1995 WBGU report focused on *temperatures only*.[60] According to experts working for the group, the communication was established through a personal

[57] RIVM (n 46); Vellinga and Swart (n 18); Rijsberman and Swart (n 15).

[58] C Els Van Daalen, Wil AH Thissen and Marcel M Berk, 'The Delft Process: Experiences with a Dialogue between Policy Makers and Global Modellers' in Joseph Alcamo, Rik Leemans and Eric Kreileman (eds), *Global Change Scenarios of the 21st Century: Results from the IMAGE 2.1 Model* (Elsevier 1998); Robert Swart and others, 'The Safe Landing Approach: Risks and Trade-Offs in Climate Change' in Joseph Alcamo, Rik Leemans and Eric Kreileman (eds), *Global Change Scenarios of the 21st Century: Results from the IMAGE 2.1 Model* (Elsevier 1998).

[59] WBGU (n 19) 5–9; WBGU (n 48) 13–21.

[60] ibid; the WBGU reports, however, included both absolute increase and rate of increase in temperature to define the 'tolerable window'.

connection between Schellnhuber and Angela Merkel.[61] However, I should note that originally the WBGU did not label its proposed target as a 2-degree target — the '2°C' figure only appeared in its later report in 1997, with a refined argument that supported the view of the Council.[62] Therefore, although it seems that the WBGU had directly influenced the German and the EU positions, the Council Conclusions had also shaped the arguments of the WBGU.

From these examples we can see that risk amplification is not a one-way process: both the messages from scientists and the responses from policymakers contributed to the selection of absolute increase in global mean temperature as the key climate indicator. In the SARF, it is argued that responses and/or interpretations of a risk message can trigger secondary impacts, creating 'ripple effects'.[63] In my case study on EU climate risk debate, policy responses and scientific recommendations have created a feedback mechanism that amplified climate risk in general and the absolute temperature target in particular. This amplification process with ripple effects has taken 'the learning and social interactions' into account.[64] More importantly, it reflects a two-way dialogue built upon the 'bridge' of the science-policymaking risk communication network that I have discussed earlier in Chapter 4.

Furthermore, this ripple effect creates links between different 'bridges' — a dialogue taken place in one channel can influence further dialogues in other channels. The WBGU joined the debate much later than the Dutch group, and based on previous studies, the WBGU proposed a new approach that was different from the common

[61] Interviews with KT (30 September 2013), DK (30 September 2013) and TD (4 September 2013).

[62] WBGU (n 48) 13–14.

[63] Kasperson and others (n 2).

[64] ibid 182.

'forwards mode'.[65] Similarly, the EEA has passively 'picked up' the notion of 2°C from the literature and mentioned it in passing, as several interviewees described,[66] suggesting that the message of the EEA was actually a secondary impact. In fact, in the climate case, multiple dialogues had taken place over a relatively short period of time, and while experts were aware of the contributions of other actors, it is difficult to identify the 'primary impact'. The amplification of climate risk was a result of overlapping layers of multiple dialogues, as one expert commented:

> I am not claiming that we were the only ones. […] An expert group saying that is one thing, the Council adopting it is another. I am sure that those things that Schellnhuber making Merkel aware would have helped because she would recognise immediately, and that didn't apply to many other [ministers].[67]

The process of risk amplification in reality is thus much more complex than the simple metaphor of ripple effects. In fact, many have argued that it is impossible to find the origin of the 2-degree target.[68] Nevertheless, the metaphor of ripple effects might still capture the story of climate case pretty nicely: even the original 2℃ stone is cast into the water and no longer to be seen, the ripples of the 2-degree target are clearly visible.

In summary, the complex dynamics of shifting the centre of discussion from GHGs to climate impacts, downplaying the scientific uncertainty of the climate system and finally the selection of an absolute temperature target can be explained with reference to the process of risk amplification. One might argue that highlighting 2℃ also means attenuating other climate indicators. Yet the amplification and attenuation of risk should be understood in a relative sense: the climate case was

[65] WBGU (n 19) 5.

[66] Interviews with ES (2 September 2013), SK (6 September 2013) and AI (28 August 2013).

[67] Interview with CM (2 April 2014).

[68] Cointe, Ravon and Guérin (n 44); Jaeger and Jaeger (n 45); Randalls (n 17).

clearly dominated by risk amplification; the euro case, on the contrary, was dominated by attenuation.

3. Euro Case: Attenuation

During interviews, almost every expert spent some time explaining what went wrong in the EMU project, arguing that the financial crisis was as result of misjudgement, blind spots or naïveté. This, I argue, reflects an *attenuation* of risk in the EMU debate. Some experts considered that it was impossible at that time to imagine 'risk' of a Eurozone crisis as we have experienced today, while others insisted that all 'risks' were in fact properly discussed. However, as I explained in the previous chapter, the strong 'make-it-work' mentality had guided risk communication of the EMU project, and thus transformed risk *of* the EMU into risk *to* the EMU, creating a perception that 'risk' has been seriously discussed.

Therefore, risk attenuation in the euro case means an overly narrow discussion that focused only on specific features of fiscal coordination and neglected systemic risks created by a monetary union. Such risk attenuation as the dynamics of inter-expert risk communication of the EMU project can be analysed through two different but interlinked aspects: narrowing the focus of discussion to nominal convergence and filtering of critical voices. These two aspects of attenuation also reflect the optimistic culture and the club network discussed in the previous chapters.

3.1 Concentrating on nominal convergence of budgetary conditions

The EMU fiscal rules were created for the purpose of facilitating fiscal coordination and maintaining budgetary disciplines. As I have introduced in a previous chapter, the

history of conceptualising the 'risk' of a monetary union as a problem of managing 'excessive deficits' can be traced back to the 1960s.[69] The Delors Report, as the blueprint of the EMU project, has defined the scope of risk communication and suggested that the EMU should 'impose constraints on national budgets to the extent to which this was necessary to prevent imbalances that might threaten monetary stability'.[70] The Commission further reaffirmed the need for convergence and budgetary discipline.[71] Following the Delors Report and the Commission, the Monetary Committee (MC), as the main expert body that designed and negotiated the fiscal rules, also confirmed that 'stability-oriented monetary policy can in the long run only be successful if supported by sound budgetary policy'.[72] The rich archival data suggest that in the early 1990s, it was well-established that converging and maintaining budgetary performances can solve potential problems of a monetary union. In other words, *convergence* as the key tool of risk management for the EMU project was a deeply entrenched idea.

While the history of the fiscal rules has already been described in Chapter 3, here I would like to emphasise that the process of concentrating the discussion on budgetary convergence was in fact a process of risk attenuation. One might argue that focusing on convergence can 'amplify' the risk perception of excessive deficits in the EMU, but as I mentioned earlier, amplification/attenuation should be understood in a relative sense. Although the idea of excessive deficits was amplified, an overly narrow

[69] Ivo Maes, 'The Ascent of the European Commission as an Actor in the Monetary Integration Proces in the 1960s' (2006) 53 Scottish Journal of Political Economy 222. See Section 3.1 Chapter 3 for more details.

[70] Committee for the Study of Economic and Monetary Union, 'Report on Economic and Monetary Union in the European Community (Delors Report)' (European Communities 1989) para 59.

[71] Commission, 'One market, one money: an evaluation of the potential benefits and costs of forming an economic and monetary union' (October 1990) 44 European Economy.

[72] MC, 'Report by the Chairman of the alternates on some major implications of government deficits for monetary integration' (10 January 1989) II/17/89-EN, 4.

focus on converging budgetary performances among Member States had in fact significantly attenuated the perception of a systemic risk in the Eurozone. Risk, in the context of the euro case, was narrowly defined and considered manageable through budgetary disciplines and convergence criteria. This attenuated risk perception has left many potential risks unidentified and created several regulatory blind spots, which arguably contributed to the subsequent Eurozone crisis. An expert working for central banking recalled that 'the risk as it was assessed then was very different and in a way simpler than the risk as we know it now in the crisis'.[73]

Moreover, the discussions of convergence and budgetary disciplines were confined to a rather specific context — *nominal* convergence. The term 'nominal' is contrasted with 'real' convergence: the former means convergence of macroeconomic indicators such as inflation, interest rates and budgetary positions, while the latter means converging growth, real wage costs, unemployment and productivity.[74] It is widely recognised in the economics literature that the EMU, through the Maastricht convergence criteria, followed a path of nominal convergence.[75] A comment from an expert who worked in the Commission supports this argument:

> There was a focus on nominal convergence criteria rather than real convergence criteria, because it was felt that nominal will be sufficient rather than asking for real convergence…. [We] could not focus too much on those real issues.[76]

This is partly because of the fact that a qualitative, 'real' coordination in terms of economic policies is politically very difficult to negotiate, as the interviewee seems to

[73] Interview with NS (8 April 2013).

[74] SG Hall, D Robertson and MR Wickens, 'Measuring Convergence of the EC Economies' (1992) 60 The Manchester School 99.

[75] ibid; Eckhard Hein and Achim Truger, 'European Monetary Union: Nominal Convergence, Real Divergence and Slow Growth?' (2005) 16 Structural Change and Economic Dynamics 7; Paul De Grauwe and Gunther Schnabl, 'Nominal Versus Real Convergence – EMU Entry Scenarios for the New Member States' (2005) 58 Kyklos 537.

[76] Interview with NM (16 April 2013).

suggest, but perhaps mainly because the idea of economic convergence in general was not fully studied and developed at that time.[77] The exact meaning of 'convergence' was not clearly defined in the EMU negotiation.

The rationale behind the discussion about 'convergence' is further explained by another senior expert of the Commission:

> I will say that it doesn't matter what you converge to as long as you converge to it. That was the point. […] The point was not the number; the point was the 'convergence'.[78]

What she really meant was that the emphasis on 'convergence' in the EMU debate was about converging to *a* number, not about converging to *the* best number (which, as many economists will argue, may not exist), nor about *how* to converge (i.e. not about 'real' convergence). Records of historical archives also support this observation. While the key word 'convergence' was constantly mentioned throughout the whole discussion, the concept of 'real convergence' only appeared at the beginning of the debate in 1989.[79] A broader concept of convergence, together with the discussion about 'risk of divergence'[80] within a monetary union, was then attenuated during the process of intensive negotiation of nominal convergence criteria.

This attenuation of risk reflects the special 'make-it-work' mentality mentioned in the previous chapter. Focusing the discussion on convergence and nominal budgetary criteria presuppose the soundness of current economic practices, and at the time of the Maastricht negotiation, the ongoing practice of the European Monetary

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[77] Hall, Robertson and Wickens (n 74) 100.

[78] Interview with JC (16 April 2013).

[79] For example: Commission, *Economic and Monetary Union Background Papers* (Brussels, 2 August 1989) II/04594; Commission , 'Informal working paper: convergence of the economic policies of the Member States of the European Economic Community' (Paris, 5 September 1989) DGII/07051; MC, 'Economic and Monetary Union beyond Stage I' (18 October 1989) II/06056.

[80] Commission, 'Budgetary policies and their effect: how and why schools of thought differ' in *Economic and Monetary Union Background Papers* (Brussels, 2 August 1989) II/04594, paper no 4, 8-9.

System (EMS) was guided by nominal convergence.[81] Experts treated the EMU as a natural extension of the EMS, and thus attenuated the potential risk of further monetary integration. In other words, the hidden assumption of the EMU discussion is that if the current economic situation could be maintained, a monetary union would be stable and sustainable. This could be true if all risks, though unidentified/attenuated, are already tackled in the current system and there is no new emerging risk. However, since building the EMU was essentially creating a new system, concentrating narrowly on nominal budgetary convergence had left out issues such as banking supervision and competitiveness of the economies of individual Member States.

Therefore, the dynamics of inter-expert risk communication in the euro case were dominated by risk attenuation, which was triggered by a belief in the EMU project, a confidence in the current EMS system, and a strong desire to make things work and to promote EU integration. Such attenuation of risk has transformed the risk *of* the EMU to a narrowly defined risk *to* the EMU. In fact, research on organisational risk processing reveals that there are many factors that can actually contribute to the attenuation of risk, leading 'well-meaning and honest scientists and mangers to underestimate risks'.[82] Moreover, in small expert groups, a 'groupthink syndrome' tends to generate biases and neglect new information, further attenuating the perception of risk.[83] This filtering of risk messages, as risk attenuation, is associated with the special 'club' network of the EMU negotiation.

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[81] Hall, Robertson and Wickens (n 74).

[82] Pidgeon, Kasperson and Slovic (n 2) 24 and ch 4; William R Freudenburg, 'Nothing Recedes like Success? Risk Analysis and the Organizational Amplification of Risks' (1992) 3 Risk: Issues in Health and Safety 1.

[83] Pidgeon, Kasperson and Slovic (n 2) 26; Irving Lester Janis, *Victims of Groupthink: A Psychological Study of Foreign-Policy Decisions and Fiascoes* (Houghton Mifflin Company 1972).

3.2 Filtering critical voices: a politicised club discussion

Although experts concentrated mainly on the discussion about nominal convergence, there were still quite a few critical comments regarding the risk of the EMU project at the time. My archival research suggests that these critical voices came not only from external commentators, but also from internal experts of the Commission. However, the process of inter-expert risk communication in the euro case was still dominated by risk attenuation, because these critical comments were mostly filtered. Major factors contributing to this filtering process were the club network and the politicised EMU negotiation.

After the publication of the Delors Report, the Commission organised some informal workshops and invited several external experts to join the EMU discussion.[84] While these external experts provided broader economic analyses of the EMU project, the contents of their reports were not radically critical. More importantly, these reports were not widely circulated during the subsequent discussion, and hardly created any real impact in the EMU debate.[85] However, there were several academics criticising sharply the economics of the EMU at the same time,[86] and for obvious reasons, these scholars were not invited to the informal workshops. In a letter sent to the invited experts, the Commission asked experts 'not to make any unnecessary linkages with

[84] Commission, 'Minutes of the informal EMU workshop, 11 October 1989' (17 October 1989) II/06010; Commission, 'Minutes of Workshop of EMU experts, 2 April 1990' (5 April 1990) II/02151.

[85] Only one particular report by Graham Bishop was circulated more widely, but still did not significantly influence the discussion about fiscal rules: Graham Bishop, Dirk Damrau and Michelle Miller, '1992 and Beyond: Market Discipline CAN Work in the EC Monetary Union' (Salomon Brothers Inc 1990).

[86] For example: Barry J Eichengreen, *Should the Maastricht Treaty Be Saved?* (Princeton Univ Intl Economics 1992); Willem Buiter and others, 'Excessive Deficits: Sense and Nonsense in the Treaty of Maastricht' [1993] Economic Policy 58.

this institution', in order to avoid 'misunderstanding'.[87] Even though the Commission had carefully managed its relationships with invited experts, the influence of external opinions was very limited. Archival records suggest that participations of academics were only active at the very beginning of the EMU discussion, and this observation is also supported by some interviewees.[88] Although there were contacts with academics, 'they were not integrated in the group'.[89]

In fact, stronger and potentially more influential criticisms came from within. In early 1990, an internal report of the Commission argued that fiscal coordination through the form of rigid budgetary ceilings was misleading and potentially problematic.[90] By comparing the EMU with other federally-structured countries, the report suggested that convergence should also take the 'qualitative aspect' into account and allow more flexibility in smaller countries, because '[w]hat is important for monetary policy in a monetary union is not so much the levels of national deficits but the fiscal position in the monetary union as a whole'.[91] The paper concluded that 'no simple blueprint can be devised for rule-based fiscal policy coordination on the road to monetary union', and while there should be a balance between rigid rules and flexibility, 'fiscal policy coordination cannot mean the convergence of all fiscal policy parameters.'[92] This report clearly criticised the practice of focusing on nominal convergence.

Nevertheless, although Matthes, the then Deputy Director General of DG II,

[87] Letter from the Commission (Michael Emerson) to Professor Molle (3 May 1990) II/02675.

[88] Interviews with MT (27 August 2013), KK (27 June 2013) and HR (4 April 2014).

[89] Interview with MT (27 August 2013).

[90] Commission, 'Problems of Economic Coordination: Budgetary Policy Aspects' (25 January 1990) II/007/90, 2-3.

[91] ibid 5.

[92] ibid 9.

noted on the first page of this report that it is 'a very interesting note' and should be considered in the debate,[93] this critical internal report did not go too far into the discussion. The report was presented to an internal seminar, together with several other opinions, yet only led to a conclusion that coordination through binding budgetary rules requires 'a more sophisticated analysis.'[94] Critical voices within the Commission were noticed, but they were not taken very seriously.

This attenuation of critical comments may be attributed to the hierarchical bureaucratic structure of the Commission. But there were also criticisms made by Member States, which should be treated equally to the Commission in the debate. Italy, Greece, the UK, and to a lesser extent Spain and Belgium, had all presented their critical views about fiscal coordination as nominal convergence. For example, the Italian member of the MC argued that fiscal coordination should be done in a 'flexible yet systematic and efficient way', proposing 'procedural norms' instead of nominal convergence.[95] The UK members constantly challenged that binding budgetary rules are 'neither necessary nor desirable', and advocated a market-oriented approach.[96] The Greeks were arguing fiercely that budgetary disciplines should be 'country specific'.[97] These different opinions were debated in the MC, but as minutes of meetings suggest, the conclusions summarised by the Chairs were mainly

[93] ibid cover page.

[94] Commission, 'Seminar of the Commission, Laarne, 17 February 1990: economic and monetary union' (19 February 1990) SEC(90) 366, 7.

[95] MC, 'Constraints on national budget policies in stages 2 and 3 of the Economic and Monetary Union (note by the Italian alternates of the Monetary Committee)' (13 November 1989) DGII/09837.

[96] MC, 'Constraints on national budgets: UK views', annex of 'Note for the attention of the alternate members of the Monetary Committee' (17 November 1989) II/06739.

[97] Commission, 'Note on criteria for excessive deficits (Greek contribution)' (7 November 1990) MCII/372/2/90.

following the general theme of Franco-German debate on the design of fiscal rules.[98] Moreover, toward the end of the EMU negotiation, experts were concentrating on fine-tuning the emerging criteria of nominal convergence, and deviations from that main discussion would be quickly rejected and attenuated.[99] Risk attenuation in the EMU debate reflects not only the optimistic make-it-work culture, but also the closed club network of inter-expert risk communication that prioritised harmonious, consensual agreements.

The most fundamental factor behind the optimistic culture and the club network that led to the attenuation of risk was perhaps the political nature of the EMU discussion. The euro, as many interviews and studies suggest, is a political project.[100] The MC had successfully promoted the realisation of the EMU, because of its unique blend of technical discussion with political negotiation.[101] Experts in the club were equipped with political minds, and the amplification/attenuation of messages was eventually decided by the political power of the actors. A document noted vividly how risk communication in the club was politicised:

> At one point in the discussion, [Köhler (Germany)] declared, looking directly at the Italian members, that 'certain countries' […] were the least

[98] Commission, 'Short minutes of the meeting of the Monetary Committee (Lisbon, 20th October 1989)' (25 October 1989) II/06239; MC, 'Budgetary discipline: suggested themes for the first part of the discussion under item 5 of the agenda for 22 January' (10 January 1990) II/17-90.

[99] Commission, 'Short minutes of Monetary Committee 13 March 1991' (15 March 1991) II/01624; Commission, 'Minutes of Monetary Committee, 16/17 April 1991' (22 April 1991) II/02302.

[100] Interviews with WG (11 March 2014), KK (27 June 2013), CS (27 June 2013), JC (16 April 2013) and NW (11 March 2014); many studies share the same view: Kenneth Dyson, *The Politics of the Euro-Zone: Stability or Breakdown?* (First Edition, Oxford University Press 2000); Matthew Lynn, *Bust: Greece, the Euro and the Sovereign Debt Crisis* (1 edition, Bloomberg Press 2010); David Marsh, *The Euro: The Battle for the New Global Currency* (Yale University Press 2011); Bernard Connolly, *The Rotten Heart of Europe* (Faber & Faber 2013); but also consider a more nuanced historical analysis, arguing that the euro was not merely a 'political currency': Harold James, *Making the European Monetary Union* (Belknap Press 2012).

[101] Amy Verdun, 'Governing by Committee: The Case of Monetary Policy' (EU Center of California Working Paper 1999); Age FP Bakker, *The Liberalization of Capital Movements in Europe: The Monetary Committee and Financial Integration, 1958-1994* (1st edn, Springer 1995) ch 4; Andreas Kees, 'The Monetary Committee of the European Community' (1987) 20 Kredit und Kapital 258.

> enthusiastic about agreeing criteria and deadlines for solving the deficit problem. He could understand the position of the UK members, given the political position, but he found [the positions of other countries] unacceptable. Draghi (Italy), in reply, claimed to agree totally with Köhler on substance. However, he said, it was important to strike the right balance between the necessity of convergence on the one hand and the necessity of making fast progress to EMU by a predetermined and agreed date.[102]

The above minutes recorded a politicised discussion that was dominated by Germany against the Italian position. In fact, the Italian case was considered by several interviewees as 'the political risk' of the EMU project at that time.[103] This means that the discussion was not about the risk assessment proposed by the Italian members, but about treating Italy itself as 'the risk'. Critical opinions were transformed into 'risks to the project', and the positions of Italy, as well as Spain and Greece, were rendered inconsequential and filtered. Similar records can be found in the archives, especially toward the end of the Maastricht negotiation. While the MC remained a 'club' that claimed to be consensual and harmonious, the decisions were guided by political realities that supressed critical evaluation of the EMU.

To summarise, the filtering of critical voices in the euro case has not only excluded external academic opinions, but also curbed internal criticisms. The potential dangers of a monetary union were thus attenuated through inter-expert risk communication, due to an exclusive institutional structure as well as a strong result-oriented culture that focused narrowly on the success of monetary integration. Optimism and closed discussions guided risk attenuation in the euro case, whereas pessimism and open dialogues contributed to risk amplification in the climate case. These two dynamics eventually lead to different conceptions of risk.

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[102] Commission, 'Short minutes of Monetary Committee 13 March 1991' (n 99) 3-4.

[103] Interviews with NM (16 April 2013), KK (27 June 2013) and IN (3 July 2013).

4. Science, Politics and the Two Views of Risk

The dynamics of risk communication in relation to the negotiation of the 2-degree climate target and the EMU fiscal rules can be understood as risk amplification and risk attenuation, respectively. In this final section, I will discuss how these different dynamics can further entrench the two divergent views of risk, and thus contribute to the construction of social and economic risk conceptions. Amplification/attenuation of risk leads to the paradigmatic social/economic view of risk in terms of all four key features: the 'normality' of risk, the treatments of 'probability', the framing of risk 'impacts' and the 'expertise' of risk assessment. In addition, these dynamics were actually path dependent and rooted in the historical legacies of the two risk communication processes.

The two features of *normality* (how experts characterise risk vis-à-vis the routine practice of public administration) and *probability* (how experts deal with uncertainty) can be discussed together. In the climate discussion, experts tried to establish that climate change is really happening for the purpose of policy debate. This process amplified the perception of climate risk and conceptualised dangerous climate change as an 'abnormal' phenomenon, an uncertain and emerging hazard. Some even argued that climate change is stigmatised and generates mistrust.[104] It is through this amplification/stigmatisation, climate risk becomes a special threat to humanity, a notion that enhances a 'social view' of risk, which imagines risk as an uncertain danger that requires and justifies additional controls as well as heightened regulatory attentions. The euro case, on the contrary, sees experts treating the creation of the

[104] Pidgeon, Kasperson and Slovic (n 2) 31.

EMU as an extension of the ongoing practice of the EMS. Potential problems of a monetary union can be tackled by maintaining current sound budgetary policies, and thus risk was not seriously discussed. 'Risks' to the EMU were thus not particularly uncertain or special, nor uncontrollable or unmeasurable. This attenuation of risk further strengthened an 'economic view' of risk that considers risk not only as part of the administrative routine that can be easily calculated, but also as a positive opportunity to enhance the wealth and also political integration of the EU.

The feature about *impact* is even more straightforward. In the two case studies, experts framed risk differently as a negative/positive thing, an argument I have discussed in Chapter 5. Here I want to stress that risk amplification/attenuation can further enhance the diverging conceptualisation of risk in terms of its impacts. Clearly, the consequence of climate change was perceived negatively in the 1990s when the 2-degree target was adopted. A negative label therefore not only amplified the perception of climate risk, but also constructed the social view of risk. The issue of monetary integration, on the other hand, was mostly discussed in a positive sense, at least in the early 1990s. While optimism and positive framing of the EMU debate attenuated risk perceptions of experts, it associated strongly with potential benefits and thus strengthened the economic view of risk.

This leads to my final point on *expertise* of risk analysis. The amplification of climate risk was supported by scientific evidence, and the selection of absolute temperature increase as the major indicator of climate sensitivity was based on dialogues between scientists and policymakers. Scientific methods are crucial to the identification of environmental risks and risks of new technologies, areas where the social view of risk is often mobilised. A strong reliance on scientific arguments instead of economics in the climate negotiation amplifies the risk and entrenches the

social view of risk.[105] 'Science' in the climate case thus goes hand in hand with the identification of future hazards. The risk attenuation of the euro case, however, was largely guided by politics, and the filtering of critical voices was the result of a highly politicised EMU discussion. While economic expertise is mobilised as the tool of government, using economic analysis in risk communication blurs the line between 'science' and 'politics'. In Chapter 4, I have shown that in the club network, at least in the case of EMU debate, there is a significant overlap between economic and political expertise. Through cost-benefit analysis, a political agenda of EMU was established, its risk attenuated, and an economic view of risk constructed. 'Politics' in the euro case defines not only the framework where economic analyses operate, but also the benefits of risk management. In short, *science* and *politics* are the two dominant forces behind the construction of social and economic views of risk among experts in my two case studies.

In other words, risk amplification is attributed to science in the particular case of the 2-degree climate target, whereas risk attenuation to politics in the case of EMU fiscal rules. Through the process of inter-expert risk communication and the dynamics of risk amplification/attenuation, science and politics shape the epistemologies of risk analysis and turn an initial 'view' of risk into a paradigmatic 'risk conception'. I should note that juxtaposing 'science' with 'politics' does not mean that a social view of risk is 'not political' or an economic view of risk is 'not scientific'. Nor does it mean that in the two case studies, experts were purely talking about risk in terms of science or politics. Science and politics always coexist in the discussion of risk, but

[105] However, I should clarify that the presence of 'scientific' evidence in itself does to prevent experts from adopting an 'economic' view of risk. The key distinction between the social and the economic views, in terms of expertise, is the *centrality of economic analysis* (Section 1, Chapter 2 and Chapter 4). In other words, the difference is whether 'economics' is prioritised as the key expertise of risk assessment and management.

like risk amplification/attenuation, they shape the dynamics of risk communication in a relative sense, at least in the two case studies presented in this thesis. When a process of risk communication is dominated by 'science', risk perception is amplified, and a social view of risk constructed; when dominated by 'politics', risk perception is attenuated, and an economic view of risk adopted. The domination of science or politics may lead to the divergence of risk conceptions.

Therefore, the process of the science/politics domination can be better explained by the notion of path dependence. I have shown that some historical legacies contributed to the discussion of risk in the two case studies (Section 4.1, Chapter 3). In the climate case, climate change was viewed as an issue mainly about 'science', following the legacy of acid rain research in the 1980s;[106] in the euro case, monetary integration was always about 'politics', as part of European integration process dated back to the 1960s.[107] It is only until recently, scholars consider that climate change negotiation has entered into the arena of 'high politics',[108] and the financial crisis has revealed some fundamental 'scientific problems' within the contemporary financial system.[109] While the dominance of science/politics in risk regulation standard-setting in my two case studies is not absolute, it may be deeply entrenched through risk communication and difficult to reverse.

By comparing the dynamics of risk communication in the two case studies, I have demonstrated how the networks (bridge/club) and cultures (pessimism/optimism)

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[106] Leen Hordijk, 'Use of the RAINS Model in Acid Rain Negotiations in Europe' (1991) 25 Environmental Science & Technology 596.

[107] Maes (n 69).

[108] Katherine Richardson, Will Steffen and Diana Liverman, *Climate Change: Global Risks, Challenges and Decisions* (CUP 2011) 344.

[109] Peter Temin and David Vines, *The Leaderless Economy: Why the World Economic System Fell Apart and How to Fix It* (Princeton University Press 2013); Charles AE Goodhart, *The Regulatory Response to the Financial Crisis* (Edward Elgar 2010).

of inter-expert risk communication contribute to amplification/attenuation of risk, and how these dynamics can be attributed to the dominance of 'science/politics', which eventually leads to the construction of two paradigmatic views of risk (Table 6.1). However, the dominance of science or politics in a risk issue is not just a passive reflection of the structure of risk communication, but also a 'strategy' actively mobilised by actors to discuss risk and construct risk regulation standards.

Table 6.1: Amplification, attenuation and the two risk conceptions

		Climate case (2-degree target)	Euro case (fiscal rules)
Dynamics		**Amplification**	**Attenuation**
		Perception of risk of experts *strengthened* by focusing on global mean temperature and climate science	Perception of risk of experts *weakened* by focusing on nominal convergence and the EMU politics
Risk conception		**Social view of risk**	**Economic view of risk**
Features	expertise	Amplified climate risks needed to be analysed through various methods	Attenuated risks of the EMU project prioritised economic analysis
	normality	Risk amplification enhanced a view that climate risks were abnormal, uncertain and emerging special hazards.	Risk attenuation enhanced a view that risks of the EMU were routine, calculable and manageable side-effects.
	probability		
	impact	Global mean temperature aggregated various negative climate impacts	Nominal convergence bore a positive notion of monetary integration

Chapter 7
Strategies: Precaution and Prediction

This final empirical analysis chapter will discuss the *strategies* deployed during inter-expert risk communication to facilitate the setting of the two risk regulations standards, i.e. the 2-degree climate target and the EMU fiscal rules. I argue that the final decisions in relation to these standard-setting processes reflect two different strategies adopted by experts: in the climate case, the debate was dominated by the notion of 'precaution'; in the euro case, the negotiation relied mainly on the concept of 'prediction'. The two strategies mobilised in the inter-expert risk communication process, as precaution and prediction, further entrenched the social and the economic views of risk, respectively.

The format of this chapter is slightly different from the previous three. In order to analyse risk communication strategies, I focus firstly on the outcomes of risk communication, which are in fact very similar in nature. In both cases, risk regulation standards were 'arbitrary', but arbitrary in a strategic way. The strategies that were used to arrive at these arbitrary outcomes of risk communication have quite subtle differences, and I will spend some length explaining these nuances.

I shall also stress that 'strategies' should not be confused with 'dynamics' discussed in the previous chapter, although both describe the process of risk communication and are interlinked. By strategies I mean the arguments or tactics used by actors in the risk communication process for the purpose of setting risk regulation standard, whereas dynamics refer to the amplification and/or attenuation of risk during that process. The mobilisation of specific strategies during risk communication is particularly prominent at the end of a standard-setting process where experts need to decide (hence my focus on the outcomes and the final decision-making processes).

However, this does not imply that experts use strategies only toward the end of the debate, nor does it imply that 'dynamics' and 'strategies' should be understood as two consecutive stages of a linear process.

Strategies of risk communication reflect the underlying rationale of setting risk regulation standards. They are deeply intertwined with the normative aspect of risk regulation. The final decision of a regulatory standard, together with the strategies used to reach that decision, is eventually based on normative judgements and value-laden choices. Technical experts I interviewed often called it a 'political decision'. Yet the decisions, and the strategies used to support these decisions, are based on some basic rationales of regulation, rather than simply 'politically' chosen. In the field of risk regulation, two competing paradigms of such rationales are the precautionary principle (PP) and cost-benefit analysis (CBA). While I do not intend to enter into the debate about which one is normatively superior, this chapter seeks to demonstrate that the PP and CBA have influenced the risk communication strategies deployed during the negotiation of the 2-degree target and the fiscal rules, respectively. Moreover, the PP and CBA, linked with the two dominant strategies in my two case studies, i.e. 'precaution' and 'prediction', contribute to the construction of the social and the economic views of risk.

I will start with *arbitrariness*, the common feature of the two risk regulation standards. While figures like '2˚C' and '3%/60%' are considered arbitrary, this arbitrariness in risk regulation standards reflects the strategic choices of experts that are based on feasibility and flexibility (Section 1). Further empirical analysis shows that these elements, while being common strategies of risk communication, were in fact operating with reference to two quite different rationales. In the climate case, the notion of feasibility was often associated with the idea of 'no-regret', supported by the

notion of ‘precaution’ (Section 2); in the euro case, although it seems that flexible rules were results of political compromise, they were also based on the concepts of ‘prediction’ and ‘judgement’ (Section3). The two sets of risk communication strategies, precaution and prediction, operated in different directions and led to the entrenchment of two divergent risk conceptions (Section 4).

1. Setting Risk Regulation Standards: the Art of Arbitrariness

In the last chapter I described how different messages related to risks were amplified and/or attenuated through inter-expert risk communication in the two case studies. These processes, as ‘dynamics’, narrowed down the scope of risk debate in relation to setting regulatory standards to ‘climate sensitivities’ in the climate case, and ‘nominal convergence’ in the euro case. While this clarifies why global mean temperature and debt/deficit criteria were foregrounded as key indicators of risk, it does not explain why specific figures (2˚C and 3%/60% GDP ratios) were eventually chosen as risk regulation standards.

When asked why exactly ‘2’ or ‘60’, interviewees often answered that these figures were results of ‘political decisions’. It represents an orthodox understanding of public policymaking — technical experts inform, and policymakers decide. Of course, the process of public policymaking, especially in the field of risk regulation, is much more complex than this linear view. However, my empirical observation suggests that although experts were well aware of the complexity of climate change and monetary integration, they did consider that the finishing touch of risk regulation standard-setting is ‘political’, something not purely explainable by scientific expertise, and perhaps it has to be so in order to render the making of risk regulation standards

'legitimate'.

This 'political' nature of risk regulation standard-setting is sometimes labelled as 'arbitrary' by experts. During interviews, experts had no difficulty explaining the fundamental rationales of climate targets and fiscal rules (i.e. climate sensitivities and nominal convergence, respectively). Yet at the same time many interviewees also noted that there were no 'scientific' reasons to support the choice of these exact figures for the two risk regulation standards. These standards were arbitrary, but they were also necessary.

1.1 Arbitrary but necessary

Arbitrariness of the climate target is a sensitive topic. Experts express different views when it comes to the question whether the 2-degree target is 'scientific' or not. Two interviewees, both scientists working mainly in academia, criticised the scientific foundation of the target and commented that it is 'completely arbitrary' and even 'stupid'.[1] Another two interviewees, both officials working in national ministries, considered that the target was based on sound scientific analysis.[2] The rest and the majority of experts,[3] however, shared a more nuanced mixed view: they recognised that the 2-degree target was somewhat 'arbitrary' and eventually a political, value-laden choice, but at the same time they also acknowledged that the choice of 2˚C was based on a certain degree of scientific evidence that was 'good enough'. For most experts interviewed in my research, although they would not say the 2-degree target

[1] Interviews with TD (4 September 2013) and BK (5 September 2013); see also Carlo C Jaeger and Julia Jaeger, 'Three Views of Two Degrees' (European Climate Forum 2010) ECF Working Paper 2; Richard SJ Tol, 'Europe's Long-Term Climate Target: A Critical Evaluation' (2007) 35 Energy Policy 424.

[2] Interviews with QH (6 September 2013) and UG (1 October 2013).

[3] 14 out of 19 experts interviewed for the climate case.

was ‘scientific’, they did consider the arbitrariness of the target defendable and in a certain sense, *necessary*.

While there is obviously no absolute reason supporting the choice of 2˚C instead of, say, 1.8 or 2.1˚C, the term ‘arbitrary’ was used by experts in two particular ways. The first one is a direct criticism addressed to the scientific reasoning of the German Advisory Council (WBGU). In its 1995 report establishing the ‘tolerable temperature window’, the WBGU proposed the ceiling of tolerable temperature by calculating the maximum average of paleoclimate records and then ‘extend the tolerance range by a further 0.5˚C’.[4] In other words, without this 0.5˚C ‘extension’, the calculated figure of climate sensitivity should be 1.5˚C instead of 2˚C. Some experts criticised this extra 0.5˚C as ‘completely arbitrary and even misleading’.[5]

The second meaning of arbitrariness is a general point about communicating the uncertainty behind the temperature target, as one senior expert in the EEA stated:

> As a scientist thinking about this, I clearly understood that we couldn’t pin a number down to 2 or 2.2 or 1.8. I was not ever thinking that 2 was proven to be the number, and not 2.01. As a scientist, you’re trained to think about limits and tolerances. […]
> The trouble is that people who are not scientists pick up the number 2. Then later when you say: ‘well, it could be …’ they say: ‘but you said 2!’ They become more ‘scientific’ or ‘precise’ than scientist intended, because scientists didn’t communicate clearly enough the embedded uncertainties […]. I think the problem occurred when you began to talk outside the scientific circles. You didn’t communicate well enough the uncertainties and assumptions behind using that number.[6]

Many experts concurred, and some of them made the reference to the anecdote of communication deficiency between some scientists and the Danish Prime Minister in

[4] WBGU, ‘Scenario for the Derivation of Gloval CO2 Reduction Targets and Implementation Strategies’ (WBGU 1995) 7.

[5] Interview with TD (4 September 2013); similar view also expressed by SS (31 March 2014).

[6] Interview with ES (2 September 2013).

a conference before the 2009 COP15 meeting in Copenhagen.[7] At the end of the conference, the Prime Minister was asking scientists to provide a definite figure, with no reservation, that 2˚C is *the* dangerous threshold, a request that no scientists can follow.[8] For many, the 2-degree target is arbitrary because it eventually surrendered to the political request. It does not communicate well the 'uncertainty' of science, thus actually risks the chance of being read 'unscientifically'.

However, nearly all interviewees recognised that it is indeed very difficult to communicate uncertainty. In order to facilitate risk communication, supporters of the 2-degree target argue that a certain degree of simplicity is necessary, or at least unavoidable. Their major defence against the criticism of arbitrariness is a legitimate repackaging of risk messages for better communication, a point I have discussed in Section 2, Chapter 5. Experts from the 'policymaking' side generally evaluate the 2-degree target positively. A senior official of the German environment ministry defended fiercely that the target 'is definitely not arbitrary because there was so much evidence'.[9] Other officials also acknowledged that the choice of 2˚C was based on good, or at least 'enough', scientific information.[10] Supporters from the 'science' camp, albeit being more critical, still consider the adoption of the 2-degree target a political choice backed by scientific reasoning, 'a good guideline for politicians', and ultimately, a triumph of science:

> In spite of the fact that you had these attempts to discredit the science, [politicians] actually agreed in the Copenhagen Accord to use 2˚C as a

[7] Interviews with AI (28 August 2013), KS (29 August 2013) and KA (26 August 2013), see Section 1, Chapter 3 for detail.

[8] University of Copenhagen, 'Climate Congress 2009: Closing Session' (12 March 2009) <http://video.ku.dk/video/8633484/climate-congress-2009-closing-session> accessed 10 June 2015, at 53:00.

[9] Interview with UG (1 October 2013).

[10] Interviews QH (6 September 2013), JI (25 August 2013), KA (26 August 2013) and JP (6 September 2013).

guardrail, which means they accepted the science.[11]

This triumph, for the key promoter of the 2-degree target, Schellnhuber, might well develop into a 'tragic triumph', because once a society fully accepts climate science and completely mitigates climate change, the 'science' will either be forgotten again or become overly politicised.[12]

While I do not intend to go into the discussion about the philosophy of science, it is important to note the philosophy of many scientists who advocated the 2-degree target. For them, the somewhat arbitrary yet still 'scientific' choice of 2˚C is justifiable, due to the perhaps equally arbitrary line between science and politics. The issue here is really about the limits of science in policymaking, and more importantly, about who eventually makes the 'political' decision.[13] An 'arbitrary', value-laden target like 2˚C is therefore necessary for policymaking, and there is nothing wrong for scientists to promote these targets. According to Schellnhuber, it is an 'obligation' of the scientific community 'to provide the best possible information and advice to the legitimate decision makers and to civil society.'[14] The challenge for climate scientists is where to draw the line on the 'bridge' between science and policymaking.

The argument for the 'arbitrary but necessary' approach to setting risk regulation standards is even more evident in the euro case. The Commission noted the potential arbitrariness of a numerical debt ceiling already at the beginning of the EMU negotiation in 1990. In a paper distributed to members of the Monetary Committee (MC) at the time, the Commission explained that because a theoretically undisputed

[11] Interview with KS (29 August 2013); other scientists also shared similar views: KT (30 September 2013), KX (1 April 2014), CM (2 April 2014) and BN (16 August 2013).

[12] Hans Joachim Schellnhuber, 'Tragic Triumph' (2010) 100 Climatic Change 229.

[13] This is again about the imaginary science-policymaking divide presented in the 'bridge' risk communication network (Chapter 4).

[14] Schellnhuber (n 12) 237.

'excessive' debt level could only be a number that is extremely high that 'becomes explosive', any other criterion lower than this obviously explosive number is in fact arbitrary.[15] The Commission paper continued:

> The criticism of arbitrariness holds, for instance, for the criterion saying that a Member State has an excessive deficit or public debt when its public debt/GDP ratio is higher than the Community average. Although this criterion is rather arbitrary as a definition of an optimal ceiling for debt levels, it has some virtues which warrant its use.[16]

The 'virtues' that compensate this arbitrariness, according to the Commission, are that it can provide a yardstick for convergence, and with careful design, can contain some flexibility for different cyclical situations. The view of this paper was that a certain level of arbitrariness is unavoidable, and perhaps even desirable. By distributing this paper early in the debate, the idea that the fiscal rules had to be somewhat arbitrary was more or less accepted as a common ground of discussion.

The dispute about arbitrariness resurfaced, however, toward the end of the debate, when members of the MC were trying to finalise their recommendations about the exact figures of the fiscal rules. Some argued that the 60% debt criterion was 'arbitrary, with no theoretical justification' and the 3% deficit criterion was 'plain silly'; others, however, found it acceptable 'because it was arbitrary' and the two numbers were 'mathematically consistent' with each other.[17] The general argument that defended the two numbers was that these rules were necessarily arbitrary. Moreover, they were arbitrary in a sensible way, because they were mathematically logical.

The 'mathematical' point is clearly explained by a senior Commission official

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[15] Commission, 'Criteria for Excessive Deficits in Economic and Monetary Union: Note by the Commission services' (13 November 1990) 4.

[16] ibid.

[17] Commission, 'Short minutes of Monetary Committee, 30 September 1991' (4 October 1991) II/05112.

who participated in the EMU discussion:

> Where did the number of 3% and 60% come from? Well, there is no optimal level of public debt in theory. There is no optimal level of deficit either. So what happened was at some meetings in the 90s, they did the kind of Sargent-Wallace calculation: growth in Europe, study said, was about 3%; stable inflation was defined as 2%; that makes long term interest rate a number of 5[%]. The average debt ratio was 60[%], and they just reverse engineered through the calculation to get 3[%]. So there was nothing economic about 3 and 60. […] It was not reasonable. It was not scientific. It was *arithmetic*.[18]

This statement about the EMU fiscal rules being 'arithmetic' but not 'scientific' was supported by several other interviewees[19] as well as some academic critiques.[20] As mentioned in the previous chapter, while criticisms of the EMU project were largely attenuated, the issue of arbitrariness was justified by the seemly logical mathematical calculation. Here I also want to emphasise that this 'arithmetic' was based on the average debt level of the European Community at the time (60%), which reflects the optimism of risk communication culture discussed in Chapter 5: experts considered the EMU as a continuation of the European Monetary System, and they assumed that maintaining current practice of fiscal policy would be economically sound.

The underlying message here is that although the fiscal rules were arbitrary and arithmetic, they were beautiful or at least 'simple'. The simplicity argument appeared several times in the discussion, emphasising that the final debt/deficit criterion 'must be a clear threshold, expressed in a single figure.'[21] While some countries argued that the criteria should be 'accurate' and hence possibly 'complex', the majority of the MC

[18] Interview with JC (16 April 2013, emphasis added).

[19] Interviews with CS (27 June 2013), NM (16 April 2013), IN (3 July 2013), KK (27 June 2013) and MT (27 August 2013).

[20] Barry J Eichengreen, *Should the Maastricht Treaty Be Saved?* (Princeton Univ Intl Economics 1992); Willem Buiter and others, 'Excessive Deficits: Sense and Nonsense in the Treaty of Maastricht' [1993] Economic Policy 58.

[21] MC, 'Outstanding issues on the excessive-deficit procedure (preparation for the meeting of 30 September)' (Brussels, 20 September 1991) MC/II/419-91, 2.

members as well as the Commission 'supported simple indicators as these would be most easily understood by politicians and the general public, and were in any case only providing an initial screening.'[22] This preference for arbitrariness with simplicity, as I will discussed further in Section 3 below, represents a pragmatic decision guided by the predictive power of risk assessment, as a balance between 'judgement' and 'automaticity'.

Interestingly, the simplicity defence for arbitrariness is also seen in the climate case, as an EEA expert expressed:

> Yeah, we even realized then that the 2-degree thing was quite simple, but it might be good enough just to push action so [the EEA] in a sense went along with it. […] There was a clear feeling that [climate sensitivities] need to be codified in a simple way, and the number '2' was simple.[23]

Experts knew that 2˚C was arbitrary and simple, but they considered it 'good enough' to trigger climate action. This not only affirms the 'focal point' argument that 2˚C was just a simple starting point for further policy debates,[24] but also echoes my previous point (Section 2, Chapter 5) about the 'getting-heard' mentality of a persuasive risk communication culture.

To summarise, 2˚C, 3% and 60% might be arbitrary figures, but they are also simple and necessary risk regulation standards. The figures are arbitrarily based on limited scientific evidence (the 2-degree target) or arithmetic (the fiscal rules). However, their simplicity can also facilitate risk communication and promote actions. The most salient justification for arbitrariness is the importance of having a risk regulation standard itself, i.e. rules being arbitrary but necessary. A senior official of a

[22] CoG, 'Criteria for Excessive Public Sector Deficits in Stage Three of EMU (Monetary Committee Alternates Meeting 15th November)' (note by Jenkinson, 20 November 1990) 3 and 6; MC, 'Report by the Chairman of the Alternates on their further work on the Excessive Deficit Procedure' (Brussels, 7 March 1991) II/115/91, 2.

[23] Interview with ES (2 September 2013).

[24] Jaeger and Jaeger (n 1).

national central bank captured this argument through a rather sentimental tone:

> Even though we were fully aware that this was arbitrary […,] the question is that human beings, being what they are, and politicians, being what they are, that perhaps technocrats conspire to create a rule, however arbitrary, but would tie the hands of politicians. […] The arbitrary rule might be preferable than no rule.[25]

The arbitrariness of risk regulation standards, therefore, should be understood in a strategic sense.

1.2 Strategic arbitrariness

If a rule is necessary but unavoidably arbitrary, then so be it. This does not mean that the two risk regulation standards came out of the blue. The idea that 'technocrats conspire to create a rule' is intriguing, suggesting a strategic collaboration between experts for the purpose of standard-setting. Such *strategic arbitrariness*, I argue, is a key element of inter-expert risk communication.

To elaborate, strategic arbitrariness refers to the status of risk regulation standards, which are informed by sciences and decided through some value-laden judgements (a process that my interviewees often described as making 'political decisions'). This strategic arbitrariness also reflects the 'strategies' of inter-expert risk communication, which are adopted to facilitate the aforementioned decision making. While I am more interested in the latter, i.e. the strategies of risk communication, here I will still briefly discuss some common features of the two risk regulation standards that made them arbitrary but 'good/strategic' standards.

The first one is again related to simplicity. I have explained above how simple rules/targets are preferred, because they are clear to communicate, easy to remember, and most importantly, they provide *focal points*. The term 'focal point' is introduced

[25] Interview with CS (27 June 2013).

in the game theory literature. A focal point is the natural and obvious choice in a coordination game.[26] As discussed above, the concept is used by some commentators to understand the choice of the 2-degree target.[27] In the euro case, the two figures of the fiscal rules, especially the 60% debt criterion, became natural focal points for final decisions, because they represent the default option — 60% was the average debt level of the Community in 1990, and 3% was the corresponding calculated deficit figure. Some commentators describe this choice of defaults as 'status quo bias'[28], as several interviewees recalled, people eventually chose 60% because 'we could not agree on anything else'.[29]

Simple figures are not only focal points, but also strong anchors. In Chapter 3, I have discussed *anchoring* in the context of historical legacies that influenced the creation of the two risk regulation standards. The concept of anchoring used here in this chapter is much closer to its original meaning in the behavioural economics literature.[30] The figures finally adopted as the rules/targets were those presented at the beginning of the discussion: in the climate case, 2˚C appeared as a heuristic tool for economic analysis in Nordhaus' seminal paper in the 1970s;[31] in the euro case, using the Community average level (60%) as the debt criterion was already proposed

[26] Thomas C Schelling, *The Strategy of Conflict* (Harvard University Press 1960).

[27] Jaeger and Jaeger (n 1).

[28] Richard H Thaler and Cass R Sunstein, *Nudge: Improving Decisions About Health, Wealth and Happiness* (Penguin 2009) 37–38.

[29] Interview with HG (27 August 2013); similar comments: HR (4 April 2014) and JC (16 April 2013).

[30] Daniel Kahneman, *Thinking, Fast and Slow* (Penguin 2012) ch 11.

[31] William D Nordhaus, 'Economic Growth and Climate: The Carbon Dioxide Problem' (1977) 67 The American Economic Review 341. Some argue that this is the 'origin' of the 2-degree target: Hartmut Grassel and Bert Metz, 'Climate Change: Science and the Precautionary Principle' in EEA (ed), *Late Lessons from Early Warnings: Science, Precaution, Innovation* (EEA 2013); Samuel Randalls, 'History of the 2˚C Climate Target' (2010) 1 WIREs Climate Change 598.

by the Commission in 1989,[32] and the 3% deficit ration was actually the rule adopted in France.[33]

Clearly, anchors and focal points are interlinked — simple figures become sticky and eventually shape decisions. Yet in addition to these 'tactical elements' embedded in the two risk regulation standards, I am more interested in the 'strategies' used by experts during the process of risk communication. These strategies are generally about forging consensuses and reaching compromises, but experts did use slightly different strategies in the two cases: in the climate case, they focused on finding a climate target that was 'feasible', whereas in the euro case, the debate was more about formulating 'flexible' rules.

Feasible climate targets

In the climate case, a common line of argument for choosing 2˚C is that 3˚C would be too high (too dangerous), while 1˚C would be too low (not possible), hence only 2˚C is 'feasible'. The notion of *feasibility* bears multiple meanings in climate debate: it means that reducing emissions to reach the target is technically possible; it also means that the target is economically not too costly; and most importantly, it means that there is a political will to accept this target.

The 1996 EU Council Conclusions, after adopting the 2-degree target, noted that according to the IPCC, significant reductions in GHG emissions are 'technically possible' and 'economically feasible'.[34] A senior expert participated in the EU expert group, while criticising that scientists interfered too much in the discussion of the

[32] Commission, 'Budgetary policies and their effect: how and why schools of thought differ' in *Economic and Monetary Union Background Papers* (Brussels, 2 August 1989) II/04594, paper no 4.

[33] Commission, 'Minutes of Monetary Committee, 16/17 April 1991' (22 April 1991) II/02302, 4.

[34] Council of the EU, 'Community strategy on climate change – Council conclusions' (25-26 June 1996) 1939th meeting, 8338/96 (1996 Council Conclusions) para 6.

2-degree target, argued that the target should be based on a political judgement about its feasibility:

> The issue is that politicians should weigh the information and balance that with political feasibility, to come up with a judgement. It's not the scientists that say two degrees is necessary. It's the politicians that say it.[35]

Again, the key issue here is about *who* decides what is feasible. For policymakers, they made their judgements based on the feasibility of the target; for scientists, they sought to convince policymakers, by emphasising that the target was not only scientific, but also feasible. The term feasibility has become a vehicle of communicating risk across the bridge between science and policymaking.

Therefore, scientists tended to talk about feasibility in general, in terms of whether it is (still) possible to reach the target,[36] whereas most EU and national officials would subdivide feasibility into various aspects, evaluating the target in terms of its technical, economic and political feasibilities.[37] In either way, feasibility became an expression to encompass different factors on the 'non-scientific' side of the 2-degree target, as a tool for inter-expert risk communication.

Flexible fiscal rules

Using a slightly different strategy, experts in the EMU negotiation process stressed that the criteria for fiscal rules should be 'flexible'. The concept of *flexibility* is mainly about finding criteria that everyone can accept. It is a way of pragmatic rule-making that can forge a consensus among Member States.

Comparing to the extremely simplistic 2-degree target, the rather complex exception clauses in the fiscal rules reflect this flexibility: in the deficit criterion, as

[35] Interview with CM (2 April 2014).

[36] Interviews with KX (1 April 2014), AI (28 August 2013), SK (6 September 2013) and SS (31 March 2014).

[37] Interviews with UG (1 October 2013), QH (6 September 2013) and JI (25 August 2013).

long as the excessive deficit 'has declined substantially and continuously' or 'is only exceptional and temporary', then countries are not subject to the excessive deficit procedure;[38] similarly, if the debt ratio is 'sufficiently diminishing and approaching the reference value at a satisfactory pace', then the procedure will not be triggered.[39] In terms of enforcing the fiscal rules, there was even more room for 'flexibility' in the procedure, which was heavily criticised.[40]

Exactly how 'flexible' the rules should be is until today still a much contested topic.[41] However, this research is not about the economic governance of the Eurozone. My point here is to emphasise that 'flexibility' was a key theme in the EMU negotiation, and it linked directly to the final decisions in relation to the two fiscal rules. All interviewees noted the importance of flexibility (or related concepts such as discretion and judgement) to the formulation of the fiscal rules. Yet despite intensive discussion on flexibility, it was still quite ambiguous, as an early study criticised, in terms of how the exception clauses of the fiscal rules will operate.[42]

This is because 'flexibility' is only a tool, a strategy, of risk communication, not the core of the fiscal rules. Like feasibility for the 2-degree target, the discussion about flexibility became a vehicle that carried various criticisms and diverse opinions. By talking about flexibility, experts made room for the bigger compromise of accepting numerical rules and the two proposed criteria. In other words, flexibility aggregated different 'non-numerical' discussions about the fiscal rules.

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[38] TFEU art 126(2)(a)

[39] TFEU art 126(2)(b)

[40] Mathieu Segers and Femke Van Esch, 'Behind the Veil of Budgetary Discipline: The Political Logic of the Budgetary Rules in EMU and the SGP' (2007) 45 Journal of Common Market Studies 1089.

[41] Buiter and others (n 20); Kazimierz Laski and Leon Podkaminer, 'The Basic Paradigms of EU Economic Policy-Making Need to Be Changed' (2012) 36 Cambridge Journal of Economics 253.

[42] Buiter and others (n 20).

At this point, one might question whether 'feasibility' and 'flexibility' are actually the same 'strategy'. Indeed, they both promote compromises, by aggregating different considerations into an overarching framework of discussion. The key difference here is compromise *between whom*: in the climate case, the compromise was between scientists who were advocating climate action and politicians who were not certain about the 'feasibility' of the climate target; in the euro case, the compromise was between Germany, which was promoting rigid budgetary rules, and many other countries that were worried about the 'flexibility' of the fiscal rules. To use the metaphor I have established in Chapter 4, the feasibility of the 2-degree target struck a compromise *on the bridge*, whereas the flexibility of the EMU fiscal rules facilitated a compromise *within the club*. They are indeed very similar strategies, but very different when one takes the network of risk communication actors into account.

In fact, the two similar strategies, feasibility and flexibility, are only half of the story. Since a compromise is the middle point between two different positions, the argument about feasibility/flexibility is only the mirror of two much more profound strategies of risk communication. These two strategies, being the other side of the compromise, go into two radically different directions — the *precautionary* approach of the climate target and the *predictive* power of the fiscal rules.

2. Climate Case: Precaution and No-Regrets

'Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing [precautionary] measures' — the precautionary principle (PP) is enshrined in the UNFCCC.[43] It is not surprising

[43] UNFCCC art 3(3)

that the whole climate debate is constructed around the conception of 'precaution'. Especially, as Article 191(2) TFEU has stipulated, the EU traditionally emphasises the importance of the PP in environmental policies.[44] The 1996 Council Conclusions that adopted the 2-degree target also noted that the PP should apply in climate action.[45] Furthermore, the majority of experts interviewed explicitly mentioned precaution or the PP. It is thus fair to say that 'precaution' has been a key concept that guided the discussion about climate targets.

This is of course not a strikingly new finding. Studies have long suggested that the EU is a key proponent of the PP, in particularly in areas related to the environment, health and new technologies.[46] However, in this chapter I want to emphasise that the notion of 'precaution' was used as a strategy in the climate case to facilitate inter-expert risk communication, to persuade policymakers and to strike a balance between scientific certainty and policy response. Contrary to the common criticisms of being 'indeterminate' or 'paralysing',[47] the PP in the climate context actually *promotes actions*. Unlike arguments made in relation to issues such as genetic modification technique or nanotechnology (we do not fully understand these techniques so should be cautious with their applications), European experts in the 1990s were convinced that although the science of climate change was still

[44] See also Commission, 'Communication from the Commission on the precautionary principle' (Brussels, 2 February 2000) COM(2000) 1.

[45] 1996 Council Conclusions para 6.

[46] For example: Douglas A Kysar, 'It Might Have Been: Risk, Precaution and Opportunity Costs' (2006) 22 Journal of Land Use & Environmental Law 1; Robert W Hahn and Cass R Sunstein, 'The Precautionary Principle as a Basis for Decision Making' (2005) 2 The Economist's Voice Article 8; Elizabeth Fisher, 'Precaution, Precaution Everywhere: Developing a Common Understanding of the Precautionary Principle in the European Community' (2002) 9 Maastricht Journal of European and Comparative Law 7.

[47] For example: Christopher D Stone, 'Is There a Precautionary Principle?' (2001) 31 Environmenta Law Reporter 10790; Cass R Sunstein, 'Beyond the Precautionary Principle' (2003) 151 University of Pennsylvania Law Review 1003.

incomplete, actions were needed.

Therefore, the idea of 'precaution' is a moderated version of the PP, which took other pragmatic considerations about 'feasibility' into account, and thereby justified the choice of 2˚C, as an expert recalled:

> If you only look at risk or the precautionary principle, you would have chosen a lower level [of climate sensitivity]. There was also an element of feasibility included. Can we still keep the increases [of temperature] limited to 1 or 1.5 degrees? The conclusion at the time was no. That's not possible. 2 degrees was only the best we can do. You will face considerable risk when you have a 2 degrees increase, but that has to be balanced against feasibility and the costs of realising [the 2-degree target].[48]

Focusing on precaution thus made risk dialogues between scientists and policymakers possible. While scientists often complained that it was very difficult to communicate uncertainty (hence as discussed in Chapter 5 and 6, they downplayed uncertainty and foregrounded climate impacts), policymakers tended to buy in the idea of precaution, and to believe that the 2-degree target was based on non-comprehensive but good scientific evidence:

> Precautionary principle is an important element in setting this target. […] Because it's so well-founded according to what we had, our conviction is that there's a good scientific basis and based on the EU policy approach, the precautionary approach, there was a strong case for the 2-degree target. […] In risk assessment you always have to deal with uncertainty, but that combined with a precautionary approach means rather being on the safe side, and 2˚C is rather on the upper level of the safe side.[49]

According to this expert who worked in the EU delegation team, the 'precautionary approach' was not only a way to justify the scientific foundation of the 2-degree target, but also a method to handle uncertainty. The notion of precaution had become a tool to build compromises and to choose the suitable temperature target.

The term precaution can therefore support both active/aggressive climate actions

[48] Interview with CM (2 April 2014).

[49] Interview with UG (1 October 2013).

as well as more realistic climate change policies. Moreover, the term also implies that the discussion of risk should focus on impacts. The combination of precaution and feasibility, as a set of strategies for risk communication, is nicely captured by the concept of a *no-regrets policy response*. It was mentioned explicitly in the seminal 1996 Council Conclusions, that 'significant "no-regrets" opportunities are available; and that there is a rationale, on the basis of potential risk, for action beyond no-regrets'.[50]

It means implementing policies that would be beneficial and would make 'no regrets' anyway, regardless of the scientific uncertainties at stake. In fact, the argument of no-regrets has long been part of the climate change debate.[51] A scientist explained its rationale clearly:

> I think it's much more fruitful to have certain actions that are beneficial under any circumstances, so whatever will happen, they are wise actions, they are reasonable. Like we know that [the production of] fossil fuels will decrease, because they are not renewable. So without even climate change, we should take action to replace it with something clean and renewable. […] We can tackle climate change actually indirectly, maybe even better than directly.[52]

Similar points were made by several other experts.[53] However, I should note that although the no-regrets argument can be widely seen in climate policies related to energy efficiency and renewable energy, it alone cannot justify the choice of 2˚C. In fact, the expert I quoted at length above was critical about the 2-degree target, and supported softer 'no-regrets' measures. For the discussion of climate targets, what was

[50] 1996 Council Conclusions para 6.

[51] C Boyden Gray and David B Rivkin Jr, 'A "No Regrets" Environmental Policy' [1991] Foreign Policy 47; Adam Rose and Shih-Mo Lin, 'Regrets or No Regrets-That Is the Question: Is Conservation a Costless CO_2 Mitigation Strategy?' (1995) 16 The Energy Journal 67; Rasmus Heltberg, Paul Bennett Siegel and Steen Lau Jorgensen, 'Addressing Human Vulnerability to Climate Change: Toward a "no-Regrets" Approach' (2009) 19 Global Environmental Change 89.

[52] Interview with BK (5 September 2013).

[53] Interviews with JI (25 August 2013), KX (1 April 2014), JP (6 September 2013) and QH (6 September 2013).

at play was a general language derived from the no-regrets argument, i.e. 'although we are not sure about X, we can at least do Y.' In other words, the teaching of the no-regrets argument to scientists advocating climate targets is the presentation of multiple options, which is in fact a common practice established by the IPCC — presenting several emission scenarios and pathways in contrast with the business-as-usual model.

A unique combination of 'precaution/no-regrets/feasibility' thus guided the framing of risk messages and the decision of risk regulation standards. The Dutch group, through its 'traffic lights system' and the multiple 'safe landing' pathways developed from this system, used this strategy and argued that 2˚C (as well as several other indicators) should be key climate targets, as 'the start of the marathon'.[54] The presentation of the green/amber/red traffic lights and their corresponding pathways allowed a room for compromise, meaning that 'at least' the 2˚C red zone should be avoided. The German WBGU also followed a similar strategy in seeking compromise for the climate target. Although its report did not present multiple targets, it sketched a 'tolerable window' and extended the margin of the window by 0.5˚C.[55] The overall strategy here is to maintain the possibility of compromise: it might be impossible to achieve radical emissions reduction (feasibility), but we should still take some actions (precaution), and 2˚C provides us a starting point (no-regrets).

Of course, today many are arguing that 2˚C is not enough, and it should be 1.5˚C

[54] Pier Vellinga and Rob Swart, 'The Greenhouse Marathon: A Proposal for a Global Strategy' (1991) 18 Climatic Change vii, 5. See also: Robert Swart and others, 'The Safe Landing Approach: Risks and Trade-Offs in Climate Change' in Joseph Alcamo, Rik Leemans and Eric Kreileman (eds), *Global Change Scenarios of the 21st Century: Results from the IMAGE 2.1 Model* (Elsevier 1998); Frank R Rijsberman and Rob J Swart (eds), *Targets and Indicators of Climatic Change* (Stockholm Environment Institute 1990).

[55] WBGU (n 4) 7; WBGU, 'Targets for Climate Protection' (WBGU 1997) 13–14.

or lower.[56] Yet this is exactly my point: 2˚C was never enough, it was a compromise. It was a compromise presented by scientists, knowing that 1˚C will not be 'feasible', but at least 2˚C preserved some features of 'no-regrets' and 'precaution'. In fact, archival records suggest that during the preparation of the 1996 Council Conclusions, Spain and, to a lesser extent, the UK, had argued that 'to reflect the interpretation of the IPCC report', the climate target 'is likely to be 2.5˚C'.[57] This argument, although scientifically 'correct', did not change the decision, because:

> Other delegations, while agreeing with this interpretation (i.e. 2.5˚C), appear ready to accept the present formulation (i.e. 2˚C), in connection with paragraph 6 as presently worded.[58]

The paragraph 6 that supported this 'arbitrary' decision of 2˚C includes all the key words discussed above — precaution, feasibility and no-regrets. These three elements of risk communication strategy not only influenced the messages framed by scientists, but also guided the decision of policymakers. The strategy is eventually about turning uncertainties into actions:

> [Policymakers] hate uncertainties. They want to have just one number from the scientists. […] What we do in our assessments, we try to use the uncertainties [to show] which parts are sure and which parts are uncertain.[59]

The strategy of inter-expert risk communication in the climate case, by mobilising a series of concepts, i.e. feasibility (room for compromise), no-regrets (multiple options) and precaution (obligation to act), *transformed* uncertainty into actionable items for decision-making. This strategy represents a direct and active treatment of uncertainty,

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[56] UNFCCC COP, Copenhagen Accord (7-19 December 2009) Decision 2/CP.15, para 12; Petra Tschakert, '1.5°C or 2°C: A Conduit's View from the Science-Policy Interface at COP20 in Lima, Peru' (2015) 2 Climate Change Responses 3.

[57] Council of the EU, 'Community strategy on climate change – Council conclusions' (25-26 June 1996) 1939th meeting, 8338/96, 3-4 fn 2 and 3.

[58] Council of the EU, 'Preparation of the "Environment" Council meeting on 25 June 1996' (Brussels, 11 June 1996) 8063/96, 4 fn 2.

[59] Interview with KX (1 April 2014).

which is very different from the strategy deployed in the euro case.

3. Euro Case: Prediction and Judgement

While recognising the arbitrariness of the EMU fiscal rules, de Grauwe also sees the merits of 'the Maastricht numerology' in setting concrete targets for debts and deficits, as well as its implied sustainability in public finance, if countries follow the rules.[60] Labelling the fiscal rules as 'arithmetic' or even 'numerology' certainly shows a sense of sarcasm, yet despite arguing that the rules were not 'scientific', most interviewees still evaluated them as 'good rules', or at least 'not bad'. A senior expert at the ECB considered the rules were perfectly designed with knowledge available at that time, and stressed that they provided 'precise quantified fiscal objectives', which were very practical tools for the Member States, as 'a yardstick for the sound conduct of public finance.'[61] The problem of the EMU, as many experts argued during interviews, is that these rules were not followed or enforced.

The beauty of the fiscal rules, albeit being quite arbitrary, is that they offer a standard to 'predict' excessive debts and deficits. However, while experts involved in creating the rules can generally agree on the two criteria, archival records suggest that experts entered into serious debate when it came to areas of enforcement and sanctions.[62] In fact, the details of the Stability and Growth Pact, in particularly those related to the excessive deficit procedure (EDP), are still contested and subjected to

[60] Paul De Grauwe, 'The Stability and Growth Pact in Need of Reform' (University of Leiden 2003) 3 <http://www.researchgate.net/publication/237308330> accessed 7 July 2015.

[61] Interview with NS (8 April 2013).

[62] For example: Commission, 'Short minutes of Monetary Committee 13 March 1991' (15 March 1991) II/01624; Commission, 'Minutes of Monetary Committee, 16/17 April 1991' (n 33).

continuous reform today.[63] During the Maastricht negotiation, the two criteria of the fiscal rules were accepted, but their implementation was softened: instead of relying on automatic enforcement, the EDP is a procedure based on the two criteria as well as judgements made by the Commission and the Council.[64]

Therefore, the EMU fiscal rules, like the 2-degree climate target, were results compromises. As mentioned, the main compromise was between different Member States: on the one hand, it was Germany (with moderate support from the Netherlands) that advocated rigid rules with 'automaticity'; on the other hand, many other countries (Greece and Spain in particular) argued that fiscal rules should be country specific and based on 'judgements'. This 'automaticity v judgement' debate was a key theme of the EMU negotiation, as interviews and minutes of the MC suggest.[65] The EDP, in the end, relies on both the initial screening of the two numerical ceilings (3% deficit and 60% debt) and the final judgement of the Council. It preserved some elements of automatic *prediction*, but it also included many exception clauses as mechanisms of *flexibility* as well as a procedure based on *judgements*.

These three elements, prediction, flexibility and judgement, formulated together a strategy for inter-expert risk communication in the euro case. The purpose of my analysis here is to demonstrate how the strategy operated during risk communication

[63] Ludger Schuknecht and others, 'The Stability and Growth Pact: Crisis and Reform' (ECB 2011) Occasional Papers 129; Stefano Micossi and Fabrizia Peirce, 'Flexibility Clauses in the Stability and Growth Pact: No Need for Revision' (CEPS 2014) Policy Briefs 319. The Commission also made its own review, for example: Commission, 'Economic governance review: Report on the application of Regulations (EU) 1173/2011. 1174/2011, 1175/2011, 1176/2011, 1177/2011, 472/2013 and 473/2013'(Brussels, 28 November 2014) COM(2014) 905 final.

[64] Council Regulation (EC) 1467/97 of 7 July 1997 on speeding up and clarifying the implementation of the excessive deficit procedure [1997] OJ L209/6.

[65] For example: MC, 'Budgetary discipline: suggested themes for the first part of the discussion under item 5 of the agenda for 22 January' (10 January 1990) II/17/90; MC, 'Budgetary policy: points for an emerging consensus' (Brussels, 6 February 1990) II/64/90-EN; CoG, 'Criteria for Excessive Public Sector Deficits in Stage Three of EMU' (n 22); also interviews with NW (11 March 2013), NM (16 April 2013), KK (27 June 2013), HG (27 August 2013) and HR (4 April 2014).

to strike compromises. Although I have discussed flexibility at length in Section 1.2, it is important to clarify here that the concept of flexibility is different from the one of judgement. The flexibility argument basically worked against rigid fiscal rules. By saying rules should be country specific, Greece, Spain and Portugal found themselves in a similar position as the UK, who promoted market-oriented regulation and opposed any form of centralised 'rules' at the EU level.[66] The notion of judgement, however, is the *procedural aspect* of rules. This is an argument advanced by the Commission, and occasionally supported by France and other countries.[67] Accepting that the EDP needs to be based on judgements actually presuppose a rule, and thereby confined the flexibility argument to discussions about its exception clauses. Clearly, 'judgement' is the key strategy to convince the experts that risks of excessive debt/deficit can be curtailed by (flexible) rules. A senior official of the Commission explained:

> [Automaticity] was not accepted. The Commission took a strong position saying: 'These are the rules. There is a commitment to meet these rules, but at a certain point in time, we need to use the judgement.'[68]

By trading off automaticity, the notion of judgement sealed the deal for concrete rules and limited the discussion of flexibility. Moreover, it further strengthened the idea that fixed budgetary criteria, with the help of some judgements and flexible designs, can limit the risk of public finance and 'predict' the economic performance of Member States in a monetary union.

Prediction (amended by flexible interpretation and judgements), therefore,

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[66] Commission, 'Short minutes of the meeting of the Monetary Committee (Lisbon, 20th October 1989)' (25 October 1989) II/06239; MC, 'Constraints on national budgets: UK views', annex of 'Note for the attention of the alternate members of the Monetary Committee' (17 November 1989) II/06739. The British opposition against the fiscal rules was eventually resolved by an opt-out of the EMU.

[67] Commission, 'Minutes of Monetary Committee, 16/17 April 1991' (n 33); CoG, 'Criteria for Excessive Public Sector Deficits in Stage Three of EMU' (n 22).

[68] Interview with HR (4 April 2014).

became the central concept that guided the EMU risk debate. Although experts had established the necessity of nominal convergence through earlier discussions that attenuated risks, as discussed in Chapter 6, the final decision of the two budgetary ceilings, in particular the negotiation of their reference values (3% and 60%), centred largely around their predictive power. Members of the MC proposed various formula and criteria that they thought can best detect excessive deficits/debts.[69] However, while experts provided fairly professional and sophisticated analysis to back their proposals, the discussion about excessive deficit criteria stagnated, until a paper presented by the Commission changed the dynamics in early 1991.

This key paper, the *Real World Examples* report, provided some 'simulations' of the predictive power of several criteria on the table.[70] While this paper has been briefly discussed in Chapter 3, here I focus on how these 'real world' examples facilitated risk communication, by putting 'predictions' into contexts. Based on historical data from 1981 and forecasts of 1991 and 1992, the paper examined how Member States performed under various proposed criteria, and found that in terms of debt-to-GDP ratio, a 60% reference value would detect, among others, Greece and Italy as having excessive public debts.[71] It continued:

> If the reference level would be lower, say 50%, the above conclusions would remain unchanged, since in 1990 Community debt-to-GDP ratios were either below 45% or above 60%. By increasing the reference level, say to 70%, the 1990 debt-to-GDP ratios of Denmark and Portugal would no longer classify as being too high. This would go contrary to conclusions of, for instance, the Commission's Annual Economic Report 1990-1991. In present circumstances, 60% therefore seems an appropriate

[69] MC, 'Note for the attention of the alternate members of the Monetary Committee' (17 November 1989) II/06738, annexes II/393/89 (reports submitted by the Belgian, Danish, German, French and British alternates) and document 891113/DGII/09837 (note by the Italian alternates).

[70] Commission, 'Criteria for excessive deficits: applications to real world examples' (Brussels, 7 February 1991) II/56/91-EN.

[71] ibid 3-5.

reference level.[72]

The paper thus used empirical evidence to justify why predictions provided by a 60% debt-to-GDP ratio criterion were precise enough. In terms of deficit-to-GDP ratio, the results presented in the paper followed a similar logic but were more complicated. It suggested that a 4% deficit-to-GDP ratio criterion could be adequate, but also noted that the 'golden rule' criterion was more stringent than a 4 to 5% deficit ceiling.[73] In short, while historical data presented a clear picture that 60% could be a favourable reference value for debt ratio, the results of the deficit criterion were less clear.

Nevertheless, the Real World Examples paper allowed experts to 'see' the prediction and was well-received. The Alternates of the MC found the paper 'illuminating' and thus triggered 'a cautions movement' to a 60% debt criterion.[74] The full MC, albeit still having diverse opinions on the criteria, agreed widely that the Commission report had been 'very helpful'.[75] This paper was thus constantly referenced and similar exercises continued in several subsequent meetings, which gave rise to a consensus on the 60% debt criterion and further discussion about the deficit criterion.[76]

On top of providing empirical evidences, experts also evaluated the predictive power of the rules by 'imagination' — through a metaphor of 'fish-catching'. In terms of the unsettled deficit criterion, many countries (led by Italy and Portugal) argued

[72] ibid 6.

[73] ibid 6-15.

[74] MC, 'Report by the Chairman of the Alternates on Their Further Work on the Excessive Deficit Procedure' (Brussels, 7 March 1991) II/115/91-EN. In fact, seven Member States agreed, dissented by Belgium, Spain, Greece, Ireland and Italy: CoG, 'Excessive budget deficits of sanctions in EMU (Monetary Committee alternates meeting 1 March 1991)' (note by Jenkinson) 2-3.

[75] Commission, 'Short minutes of Monetary Committee 13 March 1991' (n 62) 5.

[76] MC, 'Report by the alternates on the Excessive-Deficit Procedure' (Brussels, 12 April 1991) II/167/91-EN.

that it is not sensible to have an ultra-tight threshold, because it might 'catch too many fish', and although small fish can be thrown back into the water (through judgements), the EDP might still bring stigma and impact the market; Germany and the Netherlands defended the use of a fishing net with fine mesh, because one cannot risk 'missing a potentially big one', and more importantly, 'it was the size, not the number, of fish that was relevant' (i.e. the 'net' should not be too flexible); the Chair, seeking to strike a compromise, stressed that the criteria should at least ensure catching big fish with a 'gross error'.[77]

Being more than just an amusing anecdote, the fish-catching metaphor reflects how the notion of 'prediction' governed other risk communication strategies. Judgements and flexibility were discussed under the presumption of predictive rules, which would issue warning signals with reasonable rigidity. The fiscal rules were conceptualised as a screening process, and experts were discussing trade-offs between type I errors (false positives, i.e. catching small fish) and type II errors (false negatives, i.e. failed to catch a big fish). Focusing on the *precision* of the rules, as prediction, is closely related to the method of optimisation that guided the cost-benefit analysis (CBA) in many areas of policymaking. This is not surprising, because the EMU project was in fact evaluated and justified by CBA, as established in the Commission's 'one market, one money' report.[78] While some praised the quality of the report,[79] others argued that it was 'both frustrating and useless' to quantitatively

[77] CoG, 'Fishing for Budgetary Discipline (Excessive Budget Deficits and Sanctions in EMU)' (note by Jenkinson, 25 March 1991), 2-3; MC, 'Report by the alternates on the Excessive-Deficit Procedure' (n 76) 3-4. However, I should note that while the 'fish-catching' discussion was recorded vividly in these minutes, many interviewees did not remember this discussion.

[78] Commission, 'One market, one money: an evaluation of the potential benefits and costs of forming an economic and monetary union' (October 1990) 44 European Economy.

[79] Michael J Artis, 'One Market, One Money: An Evaluation of the Potential Benefits and Costs of Forming an Economic and Monetary Union' (1991) 2 Open Economies Review 315.

analyse the costs and benefits of the EMU.[80] In any case, it seems quite clear that the philosophy of CBA had an influence on risk communication strategies, by prioritising 'prediction' (the precision of numerical rules) and adjusting it with some procedural judgements and exceptional flexibilities.

With this unique blend of 'prediction/judgement/flexibility' strategy, experts in the euro case were able to discuss 'risks' related to public finance in a monetary union and formulated a compromise. The finalised EMU fiscal rules were compromises between different Member States, facilitated by the Commission's 'arithmetic' arguments.[81] The nature of this Maastricht numerology reflects the strategic treatment of risk and uncertainty in the EMU debate, a process that was so arbitrary, even mythical, that can and should not be reviewed again:

> It was very convenient to have the rules, finally. This is not what would be put into question. Even today, the 3% and the 60% are not disputed. […] Yes, we could say time has changed, but if you open that Pandora's Box… They should by all means avoid discussing what sound public finance is. They should just re-arrange their public finance. [Changing the rules] will be a very unwelcome debate.[82]

The creation of the fiscal rules, through arbitrary numerology and a series of messy compromises, was in fact an evasive action against the uncertainty of monetary union. By emphasising the predictive power of the fiscal rules, the issue of uncertainty was *confined* to calculable risks in terms of excessive debts and deficits. This indirect, passive treatment of uncertainty, ironically, brought about precise and rigid rules, which operated under a logic that was very different from the one at play in the climate case. The strategies adopted in the two case studies may be nuanced, but they represent quite distinct treatments of uncertainty.

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[80] Charles Wyplosz, 'EMU: Why and How It Might Happen' (1997) 11 The Journal of Economic Perspectives 3.

[81] Commission, 'Minutes of Monetary Committee, 16/17 April 1991' (n 33).

[82] Interview with NS (8 April 2013).

4. Uncertainty, Strategies and the Two Views of Risk

In both case studies, risk communication strategies provided room for compromises between actors and contributed to the making of arbitrary risk regulation standards. However, although these two sets of strategies, one guided by 'precaution' and the other by 'prediction', share some similarities, they still differ in three perspectives and lead to different risk conceptions.

First of all, the compromises facilitated in the two case studies are between different actors: in the climate case, the compromise was between scientists and policymakers (across the bridge), whereas in the euro case, the compromise was between Member States (within the club). Secondly, the two main strategies, precaution and prediction, are associated with different approaches to risk regulation: the notion of precaution in the climate case focuses on understanding and avoiding risks, which links closely with the precautionary principle (PP); the idea of prediction in the euro case, on the other hand, prioritises the appraisal and management of risks, which is related to the rationale of cost-benefit analysis (CBA). Thirdly and most importantly, the two strategies and their associated risk regulatory rationales reflect two fundamentally diverse treatments of uncertainty: in the climate case, uncertainty is directly *transformed* into some actionable components for policy-making; in the euro case, uncertainty is indirectly *confined* to calculable criteria for decisions.

Since the first difference has been discussed in Section 1.2 in terms of 'feasibility and flexibility', here I will focus on the second and third differences. I will discuss firstly how the PP and CBA, as well as the two strategies presented in my two case studies, deal with risk and uncertainty. Then I will analyse how these differences

associated with risk communication strategies further strengthened the two divergent (the social and the economic) views of risk.

4.1 Dealing with uncertainty through different paths

The PP and CBA represent two apparently distinctive approaches or general attitudes to risk regulation. Much ink has been spilt on this topic. The proponents of the PP argue that the principle brings procedural, discursive and even moral rationality into decision-making.[83] The advocates of CBA stressed the normative desirability of CBA, because it provides a much more coherent and actionable framework than the PP.[84] The tension between the PP and CBA is also commonly described as a transatlantic divergent, with CBA increasingly associated with the US and the PP being supported by the EU.[85] However, my two case studies suggest that there is a split even within Europe, depending on the sectors. It might not be very helpful to simply argue that the acceptance of the PP or CBA is part of the American/European culture.

While my analysis of inter-expert risk communication reflects how the PP and CBA operate in risk regulation regimes, I do not intend to join the normative debate about the two approaches. The purpose here is simply to demonstrate how these underlying approaches shape the communication and conceptualisation of risk among experts. This is quite self-evident in the climate case. The PP has become a general principle of EU law,[86] and it is not surprising that European scientists and

[83] Douglas A Kysar, *Regulating from Nowhere: Environmental Law and the Search for Objectivity* (Yale University Press 2010).

[84] Cass R Sunstein, *Laws of Fear: Beyond the Precautionary Principle* (Cambridge University Press 2005).

[85] Jonathan B Wiener and others, *The Reality of Precaution: Comparing Risk Regulation in the United States and Europe* (RFF Press 2010); Cass R Sunstein, *The Cost-Benefit State: The Future of Regulatory Protection* (American Bar Association 2002).

[86] Paul Craig, *EU Administrative Law* (2nd edn, OUP 2012) ch 21.

policymakers used concepts like 'precaution' and 'no-regrets' to frame their messages and guide their thinking about climate risks.

In the euro case, the relationship between CBA and the risk communication strategy of 'prediction' requires more explanation. CBA asks actors to weigh all relevant costs and benefits associated with an action or a project before making any decision. It is widely considered to be connected with utilitarianism, relying on calculative rationality.[87] This process of calculation is sometimes criticised in the regulation literature, for it requires sophisticated economic techniques such as assigning monetary values to individuals' lives and rights, or discounting future costs and benefits.[88] Nevertheless, 'calculation' was the main motif behind the discussion of fiscal rules, which supported the evaluation of Member States' economic performance in the EMU. In order to make sure that countries' fiscal positions converge before joining the monetary union, the two budgetary criteria were designed to predict the 'risk' of future Eurozone members, a prediction moderated by certain levels of flexibility and judgements. While many experts mentioned that Italy was the main 'risk' of the monetary union at the time,[89] the purpose of the fiscal rules was to calculate that risk and to provide criteria with good precision. Therefore, while the use of 'prediction' in the EMU debate was not essentially a cost-benefit test of potential EMU members, it did follow a similar logic that focused on quantitative evaluation.

At this point I should emphasise that I am not suggesting that the discussion of

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[87] Peter S Wenz, 'CBA, Utilitarianism, and Reliance upon Intuitions' in George J Agich and Charles E Begley (eds), *The Price of Health* (Springer Netherlands 1986); Rosemary Lowry and Martin Peterson, 'Cost-Benefit Analysis and Non-Utilitarian Ethics' (2012) 11 Politics, Philosophy & Economics 258.

[88] Robert H. Frank, 'Why Is Cost-Benefit Analysis so Controversial?' (2000) 29 The Journal of Legal Studies 913.

[89] Interviews with NW (11 March 2013), NM (16 April 2013), CS (27 June 2013), KK (27 June 2013); some minutes of the MC also support this claim, for example: Commission, 'Short minutes of Monetary Committee 13 March 1991' (n 62).

the 2-degree target was *only* about precaution, and the one of the fiscal rules *only* about prediction. Quite the contrary, the PP or CBA was never the sole regulatory rationale in operation, as some experts in the climate case mentioned explicitly the costs of climate action,[90] and others in the euro case talked about precaution.[91] In fact, the concepts of 'no-regrets' and 'feasibility' used in the climate discussion contain some elements of CBA, and the argument advanced by Germany that fiscal rules should err on the stringent side, i.e. preferring false negatives than false positives, is actually a precautionary concept. Normatively speaking, CBA and the PP should probably coexist in regulatory regimes, as commentators from both camps suggest.[92] The goal of this chapter, however, is to emphasise that one often dominates over the other in a particular case, especially when it comes to how experts think and talk about risk. The PP and CBA became the two underlying rationales that supported the inter-expert risk communication strategies in the climate case and the euro case, respectively.

The dominance of the PP (precaution) and CBA (prediction) created different effects on experts' understanding of uncertainty. Climate scientists are fully aware that the climate system is complex and scientific knowledge is limited. As previous chapters have explained, experts found it difficult to communicate the embedded complexity and uncertainty directly to policymakers, and worse still, they feared that climate sceptics will use uncertainty to create 'doubts'. The language of precaution and no-regrets transformed, or deconstructed, uncertainty into smaller, actionable components that allow policymakers to make decisions. Therefore, uncertainty was

[90] Interviews with CM (2 April 2014), ES (2 September 2013), AI (28 August 2013), GF (28 August 2013) and KX (1 April 2014).

[91] Interviews with KK (27 June 2013) and PQ (8 April 2013).

[92] Kysar (n 83); Sunstein, *Laws of Fear* (n 84).

downplayed, but not hidden away — the transformation of uncertainty offered a balanced method to communicate risk across the science-policymaking bridge.

Experts in the euro club used a rather different strategy to handle uncertainty. They seldom talked about uncertainty. Instead they argued that the procedure required some judgements and the criteria needed to contain flexibility, but still, experts prioritised a rule-based system that can limit excessive budgetary behaviours with good precisions. By maintaining that risk of public finance is calculable or at least measurable, they bypass the issue of uncertainty in a newly created monetary union, and presuppose sound public finance as the continuous operation of the current system. As mentioned in previous chapters, the 'risk' of the EMU was narrowed down to the matter of nominal convergence. This circumvention of uncertainty, guided by the notion of prediction, confined the debate about risk to a limited realm in which most things are by definition calculable.

The difference between 'transformed' and 'confined' uncertainty is subtle, and surely I am not proposing a sharp distinction between the two, nor am I suggesting which one is better. As set out at the beginning of this chapter, risk communication strategies in the two case studies did share many similarities. Their underlying philosophies (the PP and CBA) and implied treatment of uncertainty (transformation and confinement) are however quite different. This nuance, I argue, is crucial to the construction of two divergent risk conceptions.

4.2 Strategies and the construction of two divergent risk conceptions

How did these two different risk communication strategies and their corresponding regulatory rationales construct the social and the economic views of risk? My analysis here is again conducted through mapping the four features of the two divergent risk

conceptions: firstly, the *expertise* mobilised for the evaluation of risk (a broad range of scientific expertise in the social view, or predominantly economic expertise in the economic view); secondly, the *normality* of risk within a risk regulatory regime (risk as a special, abnormal target to be regulated in the social view, or as part of routine, normal process of risk management in the economic view); thirdly, the reading of *probability* (risk as uncertain in the social view versus risk as calculable in the economic view); and fourthly, the presentation of *impacts* of risk (looking at the negatives in the social view versus the positives in the economic view). While many features have been discussed at some length in the previous three chapters, my analysis of risk communication strategies focuses more on the issue of 'probability', which is crucial but not yet extensively covered in this thesis.

I shall, however, briefly discuss the points about expertise, normality and impact. On 'expertise', it is clear that the PP and CBA can reinforce different epistemologies. For experts involved in the climate case, the dominance of 'science' and the 'bridge' network partly triggered the adoption of the PP and its relevant risk communication strategies, which further strengthened the belief that the evaluation of climate risk, due to its complexity, should be based on a wider array of scientific methods, not exclusively on economics. In contrast, while it is not surprising that economists found the logic of CBA appealing, the like-minded 'club' they formulated and the narrowly defined risk prioritised the importance of 'prediction' in rule-making, and thereby intensified the exclusive power of economic expertise. On 'normality', the PP and CBA also contributed to different conceptions in terms of how risk is characterised in relation to regulatory routine. In the climate case, the emphasis of the PP implied that climate risk was, and perhaps still is, beyond 'normal' scientific analysis and control. Risk, in this sense, is something special and requires additional regulatory attentions.

In the euro case, the notions like prediction and judgement meant that macroeconomic risks associated with a monetary union were normal and manageable. Risk is thus part of the project, as discussed in Chapter 5, optimistically defined as risk *to* the EMU, instead of risk *of* the EMU. On the presentation of 'impacts' of risk, influences of the PP and CBA are even clearer. The PP and the idea of 'precaution' draw attention only on negative climate impacts, whereas the notion of prediction and its calculative rationality supported by CBA, put a lot of attention on benefits, or at least as equally as costs.

The point about probability is where the diverse treatments of uncertainty come in. In the climate case, experts recognised uncertainties, yet they still managed to make decisions under the condition of imperfect scientific knowledge, with the help of the PP and its associated strategies of risk communication. The language of precaution, as a direct transformation of uncertainty, enhanced the conception that the probability of risk is fundamentally uncertain and deeply entangled with the limits of science as well as the complexity of the system. The humble notion of precaution and the perceived limits of science reinforced a conviction that 'risk' is essentially complex and uncertain.[93] Therefore, an active deconstruction of uncertainty, through the rationale of the PP, enhanced a social view of risk.

Under the economic view, however, probability of risk should be calculable. This is primarily based on the Knightian view that emphasises a clear distinction between 'risk' and 'uncertainty'.[94] While this distinction is questionable, the calculative rationality of CBA operates largely on the basis of such distinction. Thus, by concentrating on the issue of prediction in rule-making, experts in the EMU debate

[93] Christof Tannert, Horst-Dietrich Elvers and Burkhard Jandrig, 'The Ethics of Uncertainty. In the Light of Possible Dangers, Research Becomes a Moral Duty' (2007) 8 EMBO Reports 892.

[94] Frank H Knight, *Risk, Uncertainty and Profit* (Hart, Schaffiner & Marx 1921).

isolated uncertainty and dealt only with risk of public finance in a narrower sense, which was measurable and calculable. In other words, although experts noticed that the issue of monetary integration was complex, the operation of CBA strengthened the idea that risks associated with the EMU were predictable. The belief in calculative rationality, supported by CBA, limited the discussion of uncertainty. This confinement of uncertainty through various risk communication strategies has therefore further entrenched an economic view of risk.

Finally, the development of risk conceptions and the influences of risk communication strategies can be further explained by *path dependence*. In the field of environmental policy, in particular in Europe, the PP is a deeply entrenched regulatory principle. Defining climate change as an environmental issue in the late 1980s, and thereby mobilising the notion of precaution, had allowed policymakers to overcome scientific uncertainties, to target climate risks as regulatory objectives, and most importantly, to formulate a strong defence against climate economics at the time. Economists like Nordhaus (who ironically first used 2˚C as a heuristic tool for economic calculation), through CBA, often argued that intensive and immediate climate actions were too costly.[95] Although many experts were aware that climate change is essentially an economic issue, they focused on the environmental case, because if one talked about economics, climate action 'would be killed right away.'[96] The predominance of precautionary approaches had marginalised climate economics in Europe in the 1990s. An initial social reading of climate risk, reinforced by the PP and its surrounding strategies, formulated a self-fulfilling prophecy that eventually led to the construction of a paradigmatic social view of risk.

[95] William D Nordhaus, 'To Slow or Not to Slow: The Economics of The Greenhouse Effect' (1991) 101 The Economic Journal 920.

[96] Interview with CM (2 April 2014).

The story of the EMU fiscal rules, quite the contrary, is dominated by economic rationality, or to be specific, the German economic thinking.[97] As explained earlier, the issue of monetary integration was rooted in the debate between the 'economist' and 'monetarist' schools, and the EMU project, as defined by the Delors Report and the Commission at its infancy, was based on CBA and budgetary rules. The debate of the EMU was therefore based on two key assumptions: the precise measurement of convergence and the predictability of risk in public finance. This belief in a rule-based system, described by one expert as 'the obsession of the Germans,'[98] had excluded other critical 'precautious' ideas. Risk was thus narrowly defined, as an expert in the MC recalled, 'the whole discussion was based on the risk *to* the single monetary policy, if we did not get the right rule'.[99] This initial emphasis on 'prediction' and rule-making had gone down a self-reinforcing path that led to an economic thinking that was fairly narrow, or as one expert criticised, 'low quality economic analyses.'[100] While my research does not attempt to criticise the fiscal rules, it is quite clear in the euro case that a particular economic understanding of risk at the beginning of a discussion can develop, through various risk communication strategies associated with CBA, into a paradigmatic economic view of risk.

Table 7.1 summarises my analysis presented in this chapter. The argument of path dependence seems to suggest, once an economic or social view is adopted, the results of inter-expert risk communication will inevitably lead to the construction of

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[97] Peter Temin and David Vines, *The Leaderless Economy: Why the World Economic System Fell Apart and How to Fix It* (Princeton University Press 2013) ch 5, in particular 180–182; David Marsh, *The Euro: The Battle for the New Global Currency* (Yale University Press 2011) ch 3; Kevin Featherstone, 'The Greek Sovereign Debt Crisis and EMU: A Failing State in a Skewed Regime' (2011) 49 Journal of Common Market Studies 193, 208.

[98] Interview with CS (27 June 2013).

[99] Interview with HG (27 August 2013).

[100] Interview with EV (3 June 2014).

the corresponding risk conception. But is this always the case? Can the 'inertia' of risk conceptualisation be reversed? Facing these questions, I suggest that my interpretation of path dependence is based on the empirical evidence of rather short periods of time around the promulgation of the two risk regulation standards. One might argue that although a particular 'view' of risk tends to be enhanced and become paradigmatic during the process of setting risk regulation standards, the continuous activities of risk communication may eventually lead to different risk conceptions. This in fact might well be the case, as commentators have started to review the flexibility of the EMU fiscal rules and to take climate economics seriously. While these potential critiques go beyond the scope of this current research, they do provide some critical ideas to think about the implications of my study, that is, to consider the identification of the social/economic view of risk as 'indicators' of the evolution of risk regulatory regimes, which is the theme of my concluding chapter.

Table 7.1: Precaution, prediction and the two risk conceptions

		Climate case (2-degree target)	Euro case (fiscal rules)
Dynamics		**Precaution**	**Prediction**
		Strategic arbitrariness justified by concepts such as precaution, no-regrets and feasibility, liked with the precautionary principle	Strategic arbitrariness justified by concepts such as prediction, judgement and flexibility, associated with cost-benefit analysis
Risk conception		**Social view of risk**	**Economic view of risk**
Features	expertise	The precautionary principle stresses the uses and limits of sciences	The notion of prediction emphasises the power of economic analysis
	normality	Precaution sees risk as an unknown and special threat to be regulated	Prediction considers risk as part of normal operation of risk management
	probability	Precaution transformed and deconstructed uncertainty	Prediction confined and ignored uncertainty
	impact	Precaution focused on the downsides of climate change	Prediction associated with the upsides of monetary integration

Chapter 8
The Evolution of Risk Conceptions in the Risk Society

There is nothing either good or bad, but thinking makes it so.
— Hamlet[1]

Our views reflect our thoughts. Risk, in the language of everyday life, is ambiguous. Sometimes we praise risk, saying 'nothing ventured, nothing gained'; at other times, we fear risk, and say 'better safe than sorry'. Risk is perceived differently in different contexts. In this thesis, I take the risk to argue that the same applies in public policymaking: two distinctive 'views' of risk are mobilised and entrenched in the particular contexts of risk regulation that I examined, though the process of inter-expert risk communication.

By thinking and talking about risk for the purpose of setting risk regulation standards, experts adopt and reinforce a certain view of risk. An initial view of risk becomes a 'paradigmatic' view, which I call 'risk conception'. I have demonstrated the construction of risk conceptions by comparing two case studies: in the climate case, a *social view of risk* was enhanced through the discussion of the 2-degree target; in the euro case, an *economic view of risk* was strengthened during the negotiation of the EMU fiscal rules. There are various ideas, concepts and epistemologies that make 'risk' thinkable. The social and the economic views of risk represent two divergent epistemologies mobilised in risk regulation.

I am aware that this claim might seem like an over generalisation of two case studies. However, I do not intend to argue that the social and the economic views of risk represent a comprehensive, overarching framework for the whole 'universe' of risk. The objective of this thesis is a modest one: by comparing two quite different

[1] William Shakespeare, *Hamlet*, Act 2, Scene 2, 1350.

case studies, I have characterised *two divergent risk conceptions* at play in the process of inter-expert risk communication. Identifying the social and the economic views of risk can provide scholars with a new lens to understand the role of risk conception in the process of setting regulatory standards.

In this concluding chapter, I will first summarise the key findings of this thesis (Section 1). Then I will discuss some potential implications of the two divergent risk conceptions, in particular how my findings can help unpack the dual face of risk in the risk society: methodologically, this thesis demonstrates the power of theory building by comparing two 'extreme' case studies (Section 2.1); furthermore, I focused on the institutionalisation of inter-expert risk communication, which can be developed into a useful analytical framework for future research (Section 2.2); and most importantly, the core thesis about the two divergent risk conceptions suggests further avenues for research, regarding how the two views of risk 'co-exist' in the same regulatory space (Section 2.3), as well as how they 'co-evolve' over time (Section 2.4).

1. Conclusion: Constructing Social and Economic Views of Risk

This thesis studies risk communication activities among experts in the EU in relation to two processes of risk regulation standard-setting, i.e. the creation of the 2-degree climate target (the climate case) and the negotiation of the EMU fiscal rules (the euro case). The inter-expert risk communication in the two cases is analysed through a mixture of historical and sociological institutionalist approaches. In terms of historical institutionalism, I focus on the notion of *path dependence* — an initial 'view' of risk can be reinforced through risk communication and developed into a 'paradigmatic view' of risk, what I call a risk conception. In terms of sociological institutionalism, I

concentrate on the *construction* of risk conceptions in the two case studies — a social view of risk in the climate case, and an economic view of risk in the euro case. In short, inter-expert risk communication entrenches two divergent views of risk and renders them paradigmatic.

After I introduced the historical background of the two case studies in Chapter 3, I divided my analysis of the actual processes of risk communication into four different but interconnected dimensions, i.e. networks, cultures, dynamics and strategies, and argued that they led to the construction of two distinctive risk conceptions. In this section, I will first recap the specific contents, patterns and behaviours of inter-expert risk communication discussed in these four analytical dimensions, and then I will summarise the four major 'features' of the social/economic view of risk that are identified in this thesis.

1.1 Four analytical dimensions of inter-expert risk communication

The first dimension, networks (Chapter 4), analyses the relations and institutional arrangements between various actors involved in the two case studies. In the climate case, an open *bridge* network stabilised the gap between scientists and policymakers, and thereby facilitated sporadic yet competitive risk communication among experts. In the euro case, a closed *club* network strengthened the central role of economics, and thus promoted intensive and harmonious risk communication. The two networks of risk communication reflect different treatments of the imaginary gap between science and policymaking.

The second dimension, cultures (Chapter 5), looks at how persuasion, a common characteristic of risk communication, can be achieved through different approaches. In the climate case, experts communicated climate risks with *pessimism*, which

focused on getting the science of climate change heard and framing it negatively as serious hazards to humankind. In the euro case, the EMU project was discussed with *optimism*, which concentrated on making the monetary union work and framing the challenges of the euro positively as opportunities for further European integration. The two different cultures give rise to different patterns of results-driven, persuasive risk communication.

The third dimension, dynamics (Chapter 6), examines the strengthening and weakening of messages related to risk. In the climate case, the discussion of climate risks resembled a process of *risk amplification*, in which experts emphasised the negative impacts of climate change and aggregated these different impacts into global mean temperature as the scientific indicator. In the euro case, the negotiation of the fiscal rules was dominated by *risk attenuation*, which narrowed down the risk of the EMU to an issue of nominal convergence and reduced the debate of risk to monetary politics. The growth and decline of experts' risk conceptions in the two case studies were thus guided by science and politics, respectively.

The fourth and final dimension, strategies (Chapter 7), reveals the underlying rationales that justify the two seemingly arbitrary risk regulation standards. In the climate case, 2˚C was considered a good target because it represented a feasible, no-regrets option that highlighted the notion of *precaution* in risk regulation. In the euro case, the 3%/60% deficit/debt-to-GDP criteria were deemed appropriate because it not only preserved certain levels of flexibility and judgement, but also operated as concrete benchmark for *prediction* in risk management. These two strategies of risk communication, linking respectively to the precautionary principle and cost-benefit analysis, led to similar outcomes of strategic arbitrariness. Table 8.1 summarises the findings of these four analytical dimensions.

Table 8.1: Four analytical dimensions of inter-expert risk communication

	CLIMATE CASE (2-DEGREE TARGET)	EURO CASE (FISCAL RULES)
NETWORKS	**Bridge**	**Club**
	Science-policy divide enhanced by sporadic and competitive risk communication	Science-policy divide reduced by intensive and harmonious risk communication
CULTURES	**Pessimism**	**Optimism**
	Persuasive risk communication based on the 'getting-heard' mentality and negative framing	Persuasive risk communication based on the 'make-it-work' mentality and positive framing
DYNAMICS	**Amplification**	**Attenuation**
	Risk perception of experts strengthened by focusing on global mean temperature and climate sciences	Risk perception of experts weakened by focusing on nominal convergence and the politics of monetary integration
STRATEGIES	**Precaution**	**Prediction**
	Strategic arbitrariness justified by concepts such as precaution, no-regrets and feasibility, linked with the precautionary principle	Strategic arbitrariness justified by concepts such as prediction, judgement and flexibility, associated with cost-benefit analysis

These four dimensions of risk communication pave the path toward constructing divergent risk conceptions. Throughout the four analytical chapters I have identified four key features that distinguish the social and the economic views of risk, and explained how various dimensions of inter-expert risk communication that I presented above can strengthen some or all of them. Grounded in the archival and interview data of the actual risk communication activities among experts, these four features of risk conception — expertise, location, probability and impact — are summarised in the next subsection.

1.2 Four features of the two divergent risk conceptions

The first and perhaps most fundamental difference between the two views of risk is the *expertise* involved in the evaluation of risk: the social view analyses risks through a broad range of scientific methods, including economics, whereas the

economic view assesses risks primarily through economic approaches. The choice of specific fields of expertise is of course part of historical trajectories and legacies of the issue about risk, but it is also partly influenced by the networks, dynamics and strategies of risk communication. In the climate case, the bridge enhanced the idea that the discussion of climate risk should take place between science and policy, and thus stressed the importance of scientific assessment. Moreover, the significantly amplified climate risks and the precautionary principle adopted in the climate debate also led experts to focus on the uses and limits of science. In the euro case, the club reduced the technical/political divide and put economic analysis at the centre of inter-expert risk communication. Furthermore, the largely attenuated risk of the EMU and the notion of prediction and the associated cost-benefit analysis have dominated the EMU debate and strengthened the belief that monetary integration is about public finance. Different epistemologies are prioritised in risk evaluation: the social view of risk relies primarily on scientific/technical risk assessment, while the economic view of risk emphasises the power of economic analysis.

The second difference between the two risk conceptions lies in the *normality* of risk, or in other words, how experts characterise risk vis-à-vis 'normal' regulatory process: the social view considers risks as abnormal, special and as 'targets' to be regulated, while the economic view sees risks as part of normal routine of economic activity or as 'side-effects' of regulation that can be managed. All four dimensions of risk communication are relevant here. In the climate case, the bridge reinforced a view that dangerous anthropogenic climate change, as a special regulatory objective, should be firstly scientifically assessed and then controlled. Moreover, the amplified climate risks provided a vivid image that climate change is something particularly dangerous and highly uncertain that needed to be mitigated. Finally, the notion of

precaution emphasised a view that climate change is an unknown new threat that should be carefully regulated. In the euro case, the club network did not actively distinguish technical experts from policymakers, which supported a view that sound management of budgetary policy in a monetary union was part of the routine of public finance. Furthermore, the 'risks *of* the EMU' were attenuated and transformed into much narrowed 'risks *to* the EMU', as some side-effects of European monetary integration that can be measured, calculated and predicted through precise rules on nominal convergence. In general, the social view of risk conceptualises risks as special events that justify additional regulatory interventions, whereas the economic view of risk understands risks in the context of risk management, as part of the routine of regulatory practice.

The third difference is how experts conceptualise the *probability* of risk: experts adopting the social view of risk stress the issue of scientific uncertainty, and consider risks as inherently uncertain; whereas experts adopting the economic view of risk often distinguish 'risk' and 'uncertainty', and believe that risks are calculable, or at least approachable, though mathematical means. This feature is related to the cultures, dynamics and strategies of risk communication. In the climate case, experts adopted a pessimistic way of persuasion, amplified climate risks and stressed the importance of precaution. Experts therefore saw the 'probability' of risk as inherent uncertainty of the complex climate system, and for the purpose of risk communication, uncertainty is often downplayed or repackaged. Scholars who criticise the precautionary principle sometimes name this phenomenon as 'probability neglect',[2] while I consider it as an active treatment of uncertainty that 'transform' uncertainty into actionable units for decisions. In the euro case, the treatment of probability followed a very different logic.

[2] Cass R Sunstein, *Laws of Fear: Beyond the Precautionary Principle* (Cambridge University Press 2005) 39–41.

Through establishing an optimistic culture, following a process of risk attenuation and embracing the power of prediction, experts believed that the risk of macroeconomic instability in a monetary union is essentially calculable and can be defined by tangible rules. Uncertainty, in the EMU debate that followed a Knightian language, is by definition different from 'risk',[3] and its discussion was 'confined' to a manageable scale. While the social view of risk is often accused of displaying probability neglect, the kind of 'uncertainty neglect' developed in the economic view of risk is equally criticised by supporters of the precautionary principle as 'ignorance'.[4]

The final and most defining difference is how the *impacts* of risk are framed: the social view of risk focuses predominantly on negative outcomes, while the economic view of risk bears a more positive connotation. The dimensions of cultures, dynamics and strategies are again relevant here. In the climate case, experts attempted to define 'dangerous' through the 2-degree target, in which climate impacts were foregrounded and scientific uncertainties backgrounded. The precautionary principle highlighted the downside of climate risk and argued that uncertainty in climate science should not be an excuse for non-action. In the euro case, the EMU fiscal rules linked the sound management of public finance to the potential benefits of a common currency and attenuated the risk of a new monetary union. The emphasis on the predictive power of the fiscal rules turned risk into opportunities. Generally speaking, the social view of risk concentrates predominantly on the negatives, while the economic view of risk includes also the positives into the balancing of costs *and* benefits.

These four pairs of contrasting features of risk conception are summarised in the next page in Table 8.2. My findings present a systematic way of identifying experts'

[3] Frank H Knight, *Risk, Uncertainty and Profit* (Hart, Schaffiner & Marx 1921).

[4] Douglas A Kysar, *Regulating from Nowhere: Environmental Law and the Search for Objectivity* (Yale University Press 2010) 71–73, 203.

'views' toward a particular risk, and the application of this thesis, as I will discuss further in the following paragraphs, is not limited to the 'inter-expert' aspect of risk communication, but can also shed light on the interplay between different risk conceptions over time and space.

Table 8.2: Four features of the two divergent risk conceptions

		CLIMATE CASE	EURO CASE
EXPERTISE		**A wider range of scientific expertise**	**More exclusively economic expertise**
	Networks	The bridge ensures the involvement of different scientific methods.	The club highlights the centrality of economics in standard-setting.
	Dynamics	Amplified climate risks needed to be analysed through various methods.	Attenuated risks of the EMU project prioritised economic analysis.
	Strategies	The precautionary principle stresses the uses and limits of sciences.	The notion of prediction emphasises the power of economic analysis.
NORMALITY		**Risk is special and abnormal**	**Risk is routine and normal**
	Networks	The bridge enhances a view that risk should be identified scientifically.	The club supports a view that risk management is part of policymaking.
	Cultures	The 'getting-heard' mentality and risk amplification create an image of climate risks as abnormal hazard that needs additional regulatory controls.	The 'make-it-work' mentality and risk attenuation consider risks as part of the normal routine of monetary integration that can be managed.
	Dynamics		
	Strategies	Precaution sees risk as a special unknown threat to be regulated.	Prediction believes risk is part of normal operation of regulation.
PROBABILITY		**Risk is uncertain**	**Risk is calculable**
	Cultures	Risk in a complex system is inherently uncertain. The issue of uncertainty is downplayed and repackaged.	A clear distinction between 'risk' and 'uncertainty'. Risk is by definition calculable and manageable.
	Dynamics		
	Strategies	Transform and deconstruct uncertainty	Confine and ignore uncertainty
IMPACT		**Risk is negative**	**Risk can be positive**
	Cultures	Risk is negatively framed.	Risk is positively framed.
	Dynamics	Risk is amplified.	Risk is attenuated.
	Strategies	Precaution focuses on the downside.	Prediction links to the upside.
RISK CONCEPTION		**SOCIAL VIEW OF RISK**	**ECONOMIC VIEW OF RISK**

2. Discussion: the Dual Face of Risk

To identify the two risk conceptions is not to create yet another useless categorisation of risk. If we are really living in a 'risk society' that is dominated by the logic of risk distribution,[5] we should face the ambiguous and multifaceted nature of 'risk'. My thesis therefore aims to bring this *dual face of risk* into the spotlight.

According to Ulrich Beck, risk 'may be defined as a systematic way of dealing with hazards and insecurities induced and introduced by modernization itself.'[6] His definition includes two statements: 'risk' is a negative thing, and 'risk' is a product of modernity. Apparently, this is a mixture of two different risk conceptions — risk as 'social bads' (a social view of risk), and risk as 'side-effects' of modernisation (an economic view of risk). Anthony Giddens, who has developed the notion of reflexive modernity together with Beck, also notes that a risk society is not necessarily a more dangerous society, and the idea of risk is linked with the desire to control the future — again, there is a mixture of both social and economic views of risk in a risk society, or in Giddens' term, a society 'after nature' and 'after tradition'.[7]

However, my thesis on the two divergent risk conceptions does not directly reject Beck and Giddens' idea of 'second modernity', nor does it particularly support other ideas of 'post-modernity' or even 'non-modernity'.[8] As a socio-legal thesis, the main

[5] Ulrich Beck, *Risk Society: Towards a New Modernity* (Sage 1992).

[6] ibid 21.

[7] Anthony Giddens, *Runaway World* (2 edition, Profile Books 2002) Ch 2. Comparing to Beck, Giddens put much more emphasis on the ambiguous, dual nature of risk in the modern world. Although Beck also notes the two faces of risk (as 'chance' and 'danger'), his argument focuses on the boundary between different treatments of risk, as the moment where an industrial society turns into a risk society, as the consequence of 'reflexive modernization'. Ulrich Beck, *World at Risk* (2 edition, Polity Press 2008) 4–9, 109–114.

[8] Bruno Latour, *We Have Never Been Modern* (Catherine Porter tr, Harvard University Press 1993).

contribution of my findings is this: for the purpose of risk regulation, we need to take these two different views of risk more seriously. Risk can be analysed in scientific and economic terms; risk is both the special target and the normal routine of regulation; risk can be highly uncertain, but can also be calculated; and most importantly, risk is simultaneously negative and positive. The two sides of risk, as Giddens points out acutely, have led to the development of two large but almost completely separate bodies of literature, with environmental risk on the one hand and financial risk on the other.[9] The findings of my thesis thus not only provide a channel for dialogues between these two separated fields of risk, but also present inter-expert risk communication as a new lens to study the construction of risk conceptions in space and over time.

I therefore propose four areas of applications of my findings. First of all, in terms of methodology, *comparing the seemly incomparable* can offer a more generic understanding of conceptions of 'risk' in regulation. Secondly, *inter-expert risk communication*, as a crucial process that institutionalises different views of risk, can offer a critical lens for the field of risk regulation. Thirdly, since a particular view of risk can dominate a risk related debate, it is crucial to examine how the two risk conceptions *co-exist* in a same risk regulatory space. Finally, while path dependence can explain the adoption of a particular view of risk in standard-setting, it is equally important to study how the two risk conceptions *co-evolve* in risk regulatory regimes over time. These discussions point to an array of future research agendas.

[9] Anthony Giddens, 'Risk and Responsibility' (1999) 62 The Modern Law Review 1, 10. However, I should also note that there are relatively new concepts, such as sustainable development, that now seek to link both fields. The role of these hybrid concepts in the evolution of risk conceptions could be a key theme for future research.

2.1 Climate change v Eurozone crisis: comparing apples and oranges?

During the course of research, I constantly encountered doubts about my comparative approach — for many, juxtaposing climate change with the financial crisis just does not make any sense. It is fair to say that, after observing a divide between two main bodies of risk-related literature (as mentioned, Giddens made a similar observation), I 'heuristically' chose to compare the process of inter-expert risk communication in relation to environmental risk and financial risk. But this is not a tongue-in-cheek kind of research that compares just for the sake of comparing. Quite the contrary, my thesis is a serious attempt to demonstrate that empirically, comparing the seemly incomparable can bring new insights to theory building.

Scholars writing about risk at a theoretical level often include different types of risk in their studies. For example, Sunstein uses various issues of risk, such as terrorist attacks, genetically modified organisms and climate change, to argue against the use of the 'strong version' of the precautionary principle and advocate the wisdom of cost-benefit analysis.[10] Posner compares various doomsday scenarios, from runaway science to asteroids impacts, and proposes regulatory responses to catastrophic risks at the international level.[11] Giddens also discusses natural catastrophes as well as risks associated with modern technologies, and distinguishes between 'external risk' and 'manufactured risk'.[12] Most notably, Beck has compared climate change, financial crises and terrorism, to explain the politics of a 'world risk society'.[13] A very general point made by this kind of conceptual comparison is that risk is *pervasive* in the

[10] Sunstein (n 2).

[11] Richard A Posner, *Catastrophe: Risk and Response* (OUP 2004).

[12] Giddens (n 7).

[13] Beck (n 7).

modern world, be it ‘natural’ or ‘anthropogenic’.

However, it seems much more difficult and less sensible to actually ‘compare’ radically different areas of risk at a closer distance. In the field of risk regulation, the comparison often takes place among several key issues related to the environment and new technologies.[14] At best, a more general view about different areas of risk is often presented in edited volumes.[15] In this perspective, Fiona Haines’ work represents a rare exception: by comparing three cases of regulatory reforms related to industrial, terrorist and financial risks, she argues that while different cases pose different challenges, the way risks are framed by politics can shape regulatory responses, and the ‘paradox’ of regulation lies in its instrumentalist, problem-oriented nature, which can successfully focus on one aspect of risk but will miss the others.[16] Such kind of close empirical work on completely different practices of risk regulation showcases the multifaceted nature of risk. To further advance a theoretical account of risk in law and regulation, more studies of this kind are required.

I do not intend to discredit studies using single case design or focusing more exclusively on environmental and/or technological risks. Each method has its merit, and can answer different questions. My findings, however, suggest that comparing financial risk with environmental risk can shed some light on the ambiguity of risk that troubles many researchers. Moreover, by carefully selecting suitable and manageable case studies, I have demonstrated that such comparison is not only possible, but also meaningful. The research design has been discussed at length

[14] For example: Elizabeth Fisher, *Risk Regulation and Administrative Constitutionalism* (Hart Publishing 2007).

[15] For example: Bettina Lange and Dania Thomas (eds), *From Economy to Society? Perspectives on Transnational Risk Regulation* (Emerald Group Publishing 2013); Bridget M Hutter (ed), *Anticipating Risks and Organising Risk Regulation* (CUP 2010).

[16] Fiona Haines, *Paradox of Regulation: What Regulation Can Achieve and What It Cannot* (Edward Elgar 2011).

elsewhere in this thesis (Chapter 1, Chapter 2 and the Appendix). While this rather unconventional comparative study posts several limits, it reveals two underlying aspects of risk that are otherwise not easily characterised. In addition, my thesis shows that the notion of inter-expert risk communication can be developed into a systematic approach to analysing the interplay between the two risk conceptions in various risk regulatory regimes.

2.2 Inter-expert risk communication: institutionalising risk conceptions

Analysing 'inter-expert risk communication' in relation to standard-setting provides a well-defined empirical focus. I have further subdivided my analysis into four different but interconnected 'dimensions', and examined risk communication activities of EU experts through a blend of historical and sociological institutionalism. The academic exercise of this thesis as a whole can become a standardised way to study the role of risk conceptions in risk regulation.

An institutionalist approach explains both the influences of institutions on human actions, as well as the construction, change and continuity of institutions in society. My analytical method is *historical*, not only because I have demonstrated that the practice of risk communication is contingent on 'historical contexts' like junctures, trajectories and legacies (Section 3, Chapter 3), but also because I suggest that 'time' can be an important variable in understanding the path dependent construction of risk conceptions. Moreover, this approach is *sociological*, as my results show, simple ideas that make sense of risk can become 'institutionalised' through the process of risk communication and thus develop into paradigmatic 'views' of risk, which I call risk conceptions. Different risk conceptions, as socially constructed institutions, can then influence behaviours of experts. Therefore, two different risk conceptions adopted by

experts shape different relationships among actors (Chapter 4), different framing of messages related to risk (Chapters 5 and 6), and most importantly, different types of strategic arbitrariness embedded in risk regulation standards (Chapter 7).

In short, experts' own conviction of risk can eventually become a self-fulfilling prophecy that guides their behaviours and decisions in risk regulation. Focusing on inter-expert risk communication fleshes out this curious process that institutionalises risk conceptions. Structures of epistemological paradigms, i.e. different conceptual frameworks that render 'risk' thinkable, are crucial to the regulation of risk. My approach highlights that in the field of risk regulation, 'idea matters'; or to borrow from Hamlet again — risk is neither good nor bad, but thinking makes it so.

With this institutional approach and the four analytical dimensions I established, the notion of inter-expert risk communication has great potential for the study of risk regulation. As mentioned, 'risk communication' is often studied for the purpose of forming better policy guidelines and communication/education programmes that can facilitate healthy dialogues about risk between the regulators and the public.[17] The dominant literature of risk communication concentrates on the 'gap' of risk perception between experts and lay people, but rarely looks at the 'internal' discussion of risk among experts themselves.[18] 'Risk communication' as such is narrowly defined and lacks some theoretical depth. This thesis has shown that analysing 'inter-expert' risk communication is not only meaningful, but in fact indispensable to building a more comprehensive medium-level theory of risk regulation.

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[17] For example: Ortwin Renn, *Risk Governance: Coping with Uncertainty in a Complex World* (Earthscan 2008) Ch 7; Frederic Bouder and Ragnar E Lofstedt, 'Improving Health and Safety: An Analysis of HSE's Risk Communication in the 21st Century' (Health and Safety Executive 2005); Caron Chess and others, 'Results of a National Symposium on Risk Communication: Next Steps for Government Agencies' (1995) 15 Risk Analysis 115; B Fischhoff, 'Risk Perception and Communication Unplugged: Twenty Years of Process' (1995) 15 Risk Analysis 137.

[18] Renn (n 17) 202.

It is not difficult to imagine the application of my analytical framework to other case studies. The same empirical focus can be applied to other areas of environmental, technological, health or safety standards, just to name a few. Furthermore, the lens of inter-expert risk communication does not have to be limited to the creation of risk regulation standards. It can be applied to the promulgation of other rules and policies, as well as to other stages of regulatory practice such as compliance, judicial review and reform. For example, instead of focusing only on standard-setting, researchers can use this framework to analyse the communication and conceptualisation of risk in relation to the creation and enforcement of various policies; they can also look for different risk conceptions presented in plans for regulatory reform, or even study the views of risk of the judiciary. Broadening the horizon will bring in more actors, bring the research of risk communication beyond the 'inter-expert' perspective, and bring my thesis about the two divergent risk conceptions into wider dimensions in terms of how these 'views' of risk interact over space and time.

2.3 Co-existence: the two systems and the risk regulatory space

The two divergent risk conceptions that depict the dual face of risk always 'co-exist'. I have noted several times in my analysis that the construction of risk conceptions should be understood in a relative sense. In the two case studies, a social/economic view became the *dominant* conceptions of risk, but not the *only* risk conception. For example: climate economics was already an established field in the 1990s, but it was only marginally integrated into the discussion about the 2-degree target at the time; the negotiation of the EMU focused on the positive side, but experts were also talking about potential problems of a monetary union. The same relativity also applies to the contrasting features of inter-expert risk communication that construct the two risk

conceptions: climate risk was amplified, but the uncertainty of the complex climate system was attenuated; the predictive power of the EMU fiscal rules was emphasised, but the choice of the reference value also included some elements of precaution. My thesis uses two 'extreme' cases to showcase the dominance of one particular view of risk in each case study. This approach may not be suitable for answering the question about 'co-existence', but it clarifies the defining traits of two risk conceptions and provides a clear starting point for future research.

The co-existence of two risk conceptions may seem obvious, but the conundrum of risk regulation is that the two views of risk remain largely incommensurable, or at least seemly incompatible. Risk can be viewed negatively or positively, but it does not mean that risk is 'neutral'; experts can think about risk as targets or side-effects of a regulatory measure, but seeing risks from all direction does not necessarily help decision-making. A crucial task of risk regulation is to contain this strange case of Jekyll and Hyde. I propose two ways to investigate such co-existence: one borrows from the research about behavioural economics, the other hinges on the concept of regulatory space.

Risk conceptions as two 'systems' of risk

The two risk conceptions I described share some similarities with the idea of 'two systems' of the mind used in psychology. In his bestseller *Thinking, Fast and Slow*, Daniel Kahneman vividly pictured the drama inside our brains played by two systems: a fast and automatic System 1 that relies on heuristics and is prone to biases; and a slow and effortful System 2 that uses logics and arithmetic for rational decisions.[19] Behavioural economics has developed into a well-established discipline with many applications in public policy, most notably the concept of 'libertarian paternalism',

[19] Daniel Kahneman, *Thinking, Fast and Slow* (Penguin 2012).

which emphasises the power of *Nudge* that uses heuristics to our benefits, or in Thaler and Sunstein's words, bridging the gap between 'Humans' and 'Econs'.[20]

Although Kahneman argues that organisations are 'better than individuals' in terms of decision-making and avoiding errors triggered by heuristics,[21] applications of behavioural economics at an organisational level have made little progress.[22] In fact, critical reviewers sometimes doubt whether experimental data can really make sense in real world economic contexts outside laboratories.[23] My observation of inter-expert risk communication, in this sense, focuses on a 'meso' level that has potentials to provide some food for thought in this field. The social view of risk, for example, concentrates on negative impacts, conducts less economic calculation, and resembles a fast, straightforward 'system' of risk evaluation; the economic view of risk, on the other hand, relies heavily on economic reasoning and offers a quantitative-oriented 'system' for decision-making. It may make sense to think about the two 'systems' of risk conceptions as different cognitive frameworks that guide organisational decisions about risks. Of course, I am not suggesting that the two 'views' can match the two 'systems' on a one-to-one basis, but the metaphor of the two systems of the mind does provide an apt framework to imagine how two different views of risk 'co-exist' in the practice of risk regulation. In psychology, System 1 allows us to make sub-optimal decisions with limited resources, while System 2 represents a mechanism of review and control. In a risk regulatory regime, it is therefore intriguing to examine the

[20] Richard H Thaler and Cass R Sunstein, *Nudge: Improving Decisions About Health, Wealth and Happiness* (Penguin 2009).

[21] Kahneman (n 19) 417–418.

[22] Some initial attempts were made in Colin Camerer and Ulrike Malmendier, 'Behavioral Organizational Economics' in Peter Diamond and Hannu Vartiainen (eds), *Behavioral Economics and Its Applications* (Princeton University Press 2007) 235.

[23] Wolfgang Pesendorfer, 'Behavioral Economics Comes of Age: A Review Essay on Advances in Behavioral Economics' (2006) 44 Journal of Economic Literature 712.

interaction between the two risk conceptions in a similar sense: does the social view of risk trigger 'biased' initial responses, which are then deliberated through a more 'rational' economic view of risk? Or is it the other way around, that the economic view of risk dominates the 'routine' of organisational decisions, while the social view of risk stimulates timely policy actions?

As mentioned, findings of behavioural economics have influenced the study of risk regulation, especially in terms of 'nudging' people's decisions. My results in relation to the two risk conceptions and inter-expert risk communication offer some material to think about risk perceptions and nudges at a meso level, i.e. *within* a risk regulatory regime. To fully understand the relations between the social and the economic views of risk, however, will require analysing risk communication in a much broader sense, *beyond* the inter-expert contexts.

Risk conceptions in a (risk) regulatory space

Besides making sense of the co-existence through a language of psychology, I propose that it may also be interesting to explore the interplay between the two views of risk in a single *risk regulatory space*. The notion of 'regulatory space' advanced by Hancher and Moran is an analytical concept that encompasses a wider range of regulatory issues, includes both public and private actors, and focuses on the play of power within such space.[24] It thus provides a 'holistic' approach that investigates the interactions of actors as well as the fragmented nature of regulation.[25] Moreover, the notion of 'space' can also be understood in a geographical sense, which associates

[24] Leigh Hancher and Michael Moran, 'Organizing Regulatory Space' in Leigh Hancher and Michael Moran (eds), *Capitalism, Culture and Regulation* (Clarendon Press 1989).

[25] Colin Scott, 'Analysing Regulatory Space: Fragmented Resources and Institutional Design' [2001] Public Law 329.

strongly with the discussion about globalisation.[26] Looking at interactions between the two risk conceptions within a specific risk regulatory space means examining how various actors communicate and conceptualise risk, how actors are included in or excluded from the discussion of risk, and how risk, as a transboundary phenomenon, is debated in a multi-level, transnational arena.

Therefore, to fully embrace the metaphor of a risk regulatory space, it is no longer sensible to only focus on 'inter-expert' risk communication. The study of co-existence will bring the general public back into the analysis of risk communication, as well as many other actors such as private firms and NGOs. This opens up a wide range of research opportunities, and can lead to concrete applications on the ground, especially in areas where competing views of risk have generated some serious challenges for risk regulation, such as issues related to banking and finance, genetically modified organism and, indeed, climate change. By mapping how various actors adopt a view of risk and influence each other's risk conceptions, the study of co-existing views of risk within a risk regulatory space can lead to a clearer picture about the impacts of risk conception on risk regulatory practice, such as how different views of risk guide the creation and interpretation of norms, how they facilitate and/or hinder compliance, and how they trigger and shape further risk regulatory reforms.

It may even be sensible to combine both analytical metaphors, by thinking of the regulatory space as a 'cognitive map' constructed by regulatory actors, and analyse the influences of risk conceptions on the internal interactions and collective decisions of in the regulatory arena. Clearly both metaphors, i.e. the two systems of the mind and the regulatory space, have given rise to huge bodies of literature that can bring my thesis about the two divergent risk conceptions forward. The co-existence study,

[26] Bettina Lange, 'Regulatory Spaces and Interactions: An Introduction' (2003) 12 Social & Legal Studies 411, 414–415.

however, cannot be completed without taking the notion of 'change' into account. It is therefore equally important to see how risk conceptions *evolve*. After all, the analysis of space in regulation is only rendered meaningful by looking at regulatory interactions and dynamics,[27] which are eventually associated with *time*.

2.4 Co-evolution: the shift of two risk conceptions over time

Risk conceptions can change over time. Historical institutionalist scholars look at both change and continuity.[28] As discussed at the end of the last chapter, although this thesis put much emphasis on continuity, the notion of path dependence can only explain the construction of risk conceptions in relation to the creation of risk regulation standards in shorter periods of time. Experts' view of risk may develop, evolve and eventually turn into a different risk conception. Moreover, since the two risk conceptions co-exist and interact with each other, it is interesting to further analyse how their interactions 'co-evolve' in a temporal sense.

Some general observations related to my two case studies can provide a starting point for the study of co-evolution and change. While I focus empirically on activities of risk communication that have taken place in the 1990s, my interviewees usually reflect their understanding of risk at the time based on their risk perception today. For example, regarding the negotiation of the EMU fiscal rules, one expert recalled that the risk discussed at the time was 'very different and in a way simpler than the risk as we know it now in the crisis',[29] and many interviewees agree that 'risk' as such as a

[27] Lange (n 26).

[28] Wolfgang Streeck and Kathleen Thelen, 'Introduction' in Wolfgang Streeck and Kathleen Thelen (eds), *Beyond Continuity: Institutional Change in Advanced Political Economies* (OUP 2005).

[29] Interview with NS (8 April 2013).

Eurozone crisis was not the central concern of the Maastricht negotiation.[30] In relation to the 2-degree target, some interviewees also considered that while the target had framed climate change into an environmental problem, experts should have emphasised the economic perspective of climate change at the beginning of the debate.[31] In fact, our perceptions of climate and macroeconomic risks have indeed changed. The famous Stern Review put climate economics back into the limelight,[32] and the recent financial crisis has sparked a call for treating climate change as an opportunity for 'green growth' or a 'green new deal'.[33] The same crisis, triggering a series of crises and overall economic recession in Europe, has generated many sceptical voices about the EMU and a more critical view about the common currency.[34] While this thesis does not deal with these current developments, it may be of future research interest to analyse the role of the 2009 financial crisis, as a critical juncture, in the 'co-evolution' of the economic and social views of risk.

What is the implication of this co-evolution to the study of risk? I argue that the evolution of risk conceptions can reflect the evolution of our knowledge. Funtowicz and Ravetz have introduced the concept of *post-normal science* to describe the kind of science required for the challenging issues of 'risk and the environment'.[35] They talk of 'post-normal' science in relation to Kuhn's idea of 'normal science', i.e. the routine

[30] Interviews with HR (4 April 2014), HG (27 August 2013), NM (16 April 2013), KK (27 June 2013) and NW (11 March 2013).

[31] Interviews with KX (1 April 2014) and RS (31 March 2014).

[32] Nicholas Stern, *The Economics of Climate Change: The Stern Review* (CUP 2007).

[33] United Nations Environmen Programme, 'Global Green New Deal: Policy Brief' (UNEP 2009).

[34] Kazimierz Laski and Leon Podkaminer, 'The Basic Paradigms of EU Economic Policy-Making Need to Be Changed' (2012) 36 Cambridge Journal of Economics 253; Kevin Featherstone, 'The Greek Sovereign Debt Crisis and EMU: A Failing State in a Skewed Regime' (2011) 49 Journal of Common Market Studies 193.

[35] Silvio O Funtowicz and Jerome R Ravetz, 'Science for the Post-Normal Age' (1993) 25 Futures 739.

science of puzzle solving that allows abnormal scientific revolution to emerge.[36] For the purpose of applying fundamental scientific knowledge (labelled as 'core science' in their paper) to policy issues, Funtowicz and Ravetz conceptualise three levels of 'problem-solving strategies': the first level is 'applied science' that deals with routine decisions with relatively low stakes and low uncertainties; the second level is called 'professional consultancy', which is based on applied science but involves decisions with higher stakes and needs to handle more complex systems; the third level, built on the previous two levels, is 'post-normal science' that seeks to resolve highly uncertain issues of high stakes.[37] Figure 8.1 illustrates this three-level framework. To help think about these three strategies of problem-solving, applied science is like maintaining the infrastructure of a city, which requires mainly knowledge of engineering; professional consultancy is the urban planning of a city, which involves wider fields of expertise and a higher level of public participation; and post-normal science, in connection with the risk of climate change, will be building a green and sustainable city, which can be highly challenging and subjected to intensive public debate.

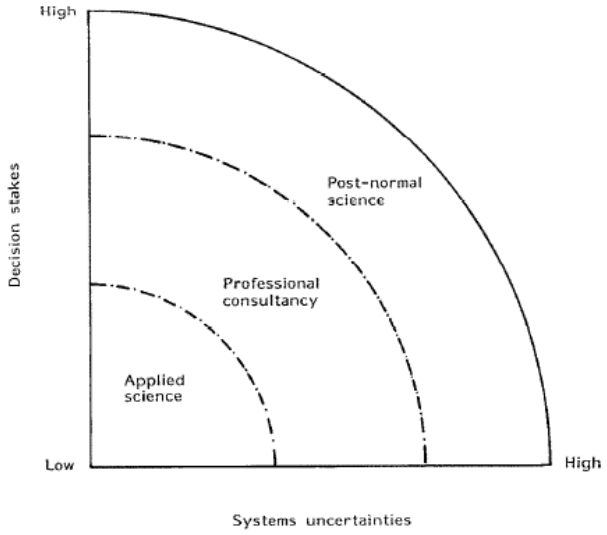

Figure 8.1. Three levels of problem-solving strategies (Funtowicz and Ravetz 1993)

[36] ibid 740 and 750; Thomas S Kuhn, *The Structure of Scientific Revolutions* (3rd edition, University of Chicago Press 1996).

[37] Funtowicz and Ravetz (n 35).

Although Funtowicz and Ravetz did not use the above examples to describe their framework, they did consider climate change as a good case of post-normal science.[38] Moreover, it should be noted that their paper actually took a 'social view' of risk, by emphasising the negatives and the inherent uncertainties of risk. While the concept of post-normal science seems to capture the regulatory challenges of some risks pretty nicely, I argue that experts involved in applied science and professional consultancy also deal with 'risk', but they tend to adopt an 'economic view' of risk. Within normal science, risk is manageable, calculable and part of the 'normal' routine of private business and public administration. In the context of my case studies, the discussion about the 2-degree climate target may be a case of post-normal science, whereas the negotiation of the EMU fiscal rules can be considered as professional consultancy, or indeed, as a natural continuation of the European Monetary System, a case of applied science/economics.

The 'co-evolution' of the two risk conceptions, putting into the context of this three-level framework, means that an issue of risk can move diagonally in Figure 8.1, either *inward* to the area of applied science (adopting a more economic view of risk) or *outward* to the field of post-normal science (adopting a more social view of risk). In fact, Funtowicz and Ravetz also emphasised that their framework 'should not be seen statically, but rather dynamically', as issues within different zones can interact and lead to an 'evolution of issues'.[39] Figure 8.2 illustrates how risk conceptions of experts may evolve over time, with the three-level framework embedded therein. Risk conceptions oscillate, and risks can 'go up and down in the experts' perception' like

[38] ibid 750–751.

[39] ibid 752.

'yo-yo risks'.[40]

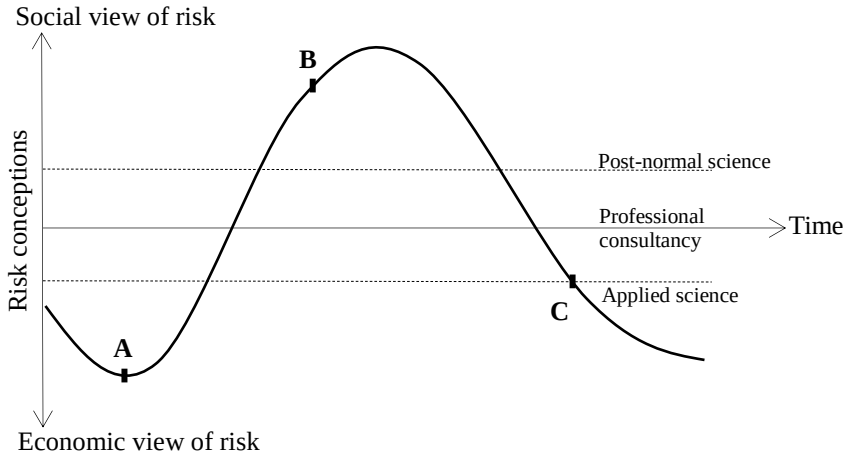

Figure 8.2 The evolution of risk conceptions

Therefore, the changing views of risk reflect not only the progress of scientific knowledge, but also the development of risk regulatory regimes. Identifying experts' risk conceptions, I argue, can be the 'indicators' of 'where we are' in the evolution of risk regulation: the social view of risk reaches its strongest form when the society faces new threats or new technologies that require the intervention of 'post-normal' science (point B in Figure 8.2); the economic view of risk tends to dominate the debate when regulatory issues are well-researched and involve only 'normal' science (points A and C). The dominance of the social view of risk clearly shows that the issues at hand are not well-contained by science, sometimes labelled as 'wicked problems', and require more research.[41] The dominance of the economic view of risk, however, is ambiguous: it may suggest that an issue is safely controlled by science (at point C), otherwise known as a 'tame' problem;[42] but it may well be the case that a

[40] ibid.

[41] Horst WJ Rittel and Melvin M Webber, 'Dilemmas in a General Theory of Planning' (1973) 4 Policy Sciences 155.

[42] ibid 160.

complex problem is emerging (at point A), and experts are experiencing 'ignorance', i.e. not knowing the embedded uncertainties and impacts of a risk.[43] The recent experience of the Eurozone crisis suggests that the EMU project was moving from point A to B, whereas the return of climate economics represents that climate change is going down the slope from point B to C. To borrow again the language of wicked problem, risk regulation becomes problematic when experts 'treat a wicked problem as though it were a tame one', 'tame a wicked problem prematurely', or even 'refuse to recognise the inherent wickedness of social problems'.[44]

This is where the precautionary principle (PP) versus cost-benefit analysis (CBA) debate comes in again. The evolutionary curve of the two risk conceptions pictured in Figure 8.2 highlights the 'procedural' aspect of risk regulation. In the last chapter I have discussed the link between the PP/CBA and the two risk communication strategies. Proponents of CBA often criticise that the strong form of the PP can only work by wearing 'blinders', focusing on the worst case and broadcasting 'fears'.[45] Supporters of the PP, on the other hand, argue that CBA represents 'ignorance' embedded in the utilitarian logic, and emphasise the procedural and discursive rationalities of the PP.[46] It seems clear that the PP associates strongly with the social view of risk, looking at uncertainties and potential negative impacts, as well as treating risk as the subject of regulation, whereas CBA is based on the economic view of risk that seeks to calculate risk by including opportunity costs and side-effects of regulation into the equation. While defenders of the PP stress the 'moral' value of the

[43] Kysar (n 4) 71–73.

[44] Rittel and Webber (n 41) 161.

[45] Sunstein (n 2).

[46] Douglas A Kysar, 'It Might Have Been: Risk, Precaution and Opportunity Costs' (2006) 22 Journal of Land Use & Environmental Law 1.

principle,[47] advocates of CBA criticise that the principle actually leads to 'moral panics'.[48] As mentioned, this thesis does not intend to discuss the meta-ethics and the normative superiority of the two regulatory approaches. Yet the application of the co-evolution study is quite clear: by identifying the dominant risk conception through the four features characterised in my thesis, we can decide whether an issue about risk is 'post-normal' and thus requires further research to render it 'normal' again, or is it safely located in the area of applied science but requires some 'precautionary' measures in case the complexity of risk is underestimated. The evolution of the social/economic views of risk suggest that CBA and the PP are equally important and should be applied at different stages of scientific and risk regulatory developments.

To summarise, my thesis about the two divergent risk conceptions can provide a new analytical lens to study the practice of risk communication and the process of risk conceptualisation, as well as to capture the paradoxical nature of 'risk' in regulation. The paradox of risk resembles what Giddens called the 'push and pull' between accusations of 'scaremongering' and 'cover-ups': experts may be blamed for cover-ups because they believe that a risk is not serious, but they may also be criticised as scaremongers by actually reducing risks successfully.[49] In the field of economics and finance, this paradox generates 'crisis economics', in which the tolerance of risk, as the very foundation of capitalism, gives rise to inevitable crises.[50] The same paradox in climate change, sometimes described as a 'tragic triumph', means the development

[47] ibid.

[48] Sunstein (n 2) 6, 94–98.

[49] Giddens (n 7) 19–21.

[50] Nouriel Roubini and Stephen Mihm, *Crisis Economics: A Crash Course in the Future of Finance* (Penguin 2011).

of climate science can eventually bring about its downfall.[51] Looking at the co-existence and co-evolution of the two risk conceptions offers us a set of helpful language to unpack the dual face of risk. We should therefore concentrate on analysing the construction of the social and/or economic views of risk in regulatory practices, instead of talking about risk in abstract and often emotional terms of 'ignorance' or 'fear'.

[51] Hans Joachim Schellnhuber, 'Tragic Triumph' (2010) 100 Climatic Change 229.

Appendix
Data Sources and Analysis

This appendix discusses various methodological issues of my thesis. The empirical data include archival records, official documents and other forms of written sources (Section 1) as well as results of 38 semi-structured interviews (Section 2). In addition to introducing these data sources and the processes of my data collection, I will also explain how I analysed these data (Section 3).

1. Archives and Documents

Different archives organise and release historical records differently. Access to historical records of the EU is regulated by the public access to documents regulation[1] and subject to the '30-year rule'[2]. Most documents related to my case studies are less than 30 years old and therefore require special processes to apply for exceptional declassification and public access.[3] Here I will note how documents were researched, acquired and released from various sources.

[1] Regulation (EC) 1049/2001 of 30 May 2001 regarding public access to European Parliament, Council and Commission documents [2001] OJ L145/43 (Regulation 1049/2001).

[2] Regulation 1049/2001 art 4(7).

[3] Regulation 1049/2001 arts 4, 6 and 7.

1.1 The Historical Archives of the European Commission[4]

The Commission archives provide rich data for both case studies. However, different DGs adopt different practices in terms of releasing documents that are less than 30 years old. In the climate case, the DG Environment directly released 11 folders of documents, mainly related to the work of the EU delegation to the UNFCCC, for me to consult and copy. After 3 days of intensive research I selected and copied around 50 documents (about 10% of the 11 released record folders) for further analysis, based on the relevance of documents to climate change targets.

In the euro case, 124 'physical units' (files or binders) of documents were made available by the DG ECFIN in the reading room of the archives for me to consult prior to 'formal release'. That is, unlike the DG Environment practice, the DG ECFIN did not perform an initial screening for my request and these files were not directly released to me. By comparing the document titles, tables of contents and catalogues, I preselected 22 physical units with higher relevance for further research. After one week of investigation I selected around 200 documents (among them 70 marked with high relevance) and applied for formal approval of access to these records. The documents were fully released to me in digital form after a declassification process for about 6 months. Five records (internal minutes of the Monetary Committee meetings noted by members of the Commission) were however marked as sensitive and released for 'private' research purpose, which means I cannot release these documents further to the public.

[4] Commission, 'Historical Archives' <http://ec.europa.eu/historical_archives/index_en.htm> accessed 30 June 2015. Documents older than 30 years are moved to the Historical Archives of the EU at the European University Institute (EUI) in Florence (EUI, 'Historical Archives of the European Union' <http://www.eui.eu/Research/HistoricalArchivesOfEU/Index.aspx> accessed 30 June 2015). While it was decided that my research will focus only on the genesis of the two risk regulation standards in the 1990s, I have also visited the historical archives at the EUI in summer 2012 and confirmed that records at the EUI archives are not highly relevant to my case studies.

1.2 The European Central Bank (ECB) Archives[5]

The archives are not physically open to the public, and the same 30-year rule applies to the ECB records.[6] I requested documents related to the making of the excessive deficit criteria from 1988 to 1992. After reviewing the list of documents provided by the archivist, the ECB selected and released around 40 documents to me, in both paper copies and digital form.

1.3 Archives of the European Environment Agency (EEA)

The EEA has a library and a document storage place for its 'archives'. I was given access to the archives with the aid of a research staff. However, the archives are not systematically organised, there is no specialised archivist, and many records are lost. The available documents show that the EEA/EEA-TF did not have enough resources at the beginning of its foundation, as many meeting records were only hand-written and there was little administrative support, which explains the poor situation of the archives. After consulting around 20 boxes of the available relevant records, I requested 15 documents that are directly relevant to the discussion and preparation about the 1995 Dobris Assessment Report.

[5] ECB, 'About the Archives' <https://www.ecb.europa.eu/ecb/history/archive/intro/html/index.en.html> accessed 30 June 2015.

[6] Decision (EC) 2004/258 of the European Central Bank of 4 March 2004 on public access to European Central Bank documents [2004] OJ L80/42, art 4(6).

1.4 Archives of the Council of the EU[7]

Subject to the same 30-year rule, requests of documents to the Council were sent through online forms. Compared to the archives of the Commission, the EEA and the ECB, the Council archives are less flexible and require precise references for documents in order to proceed with their search. Although I was able to pinpoint several key records, with precise dates and document numbers, that were presented to the Environment Council in relation to the climate debate in mid-1990s, the archivists still reported that these records were no longer available. Nevertheless, eventually I received 22 documents regarding the climate case from the Council.

For the euro case, most documents are already available in the Commission archives and covered by my previous search. The release of official documents originally made by the ECOFIN Council and the Monetary Committee was therefore coordinated by the DG ECFIN and the historical archives of the Commission.

1.5 Other Sources

Sources other than meeting minutes and public documents, sometimes referred as 'grey literature', are also included in my analysis, especially in the case study on the 2-degree climate target. Some materials were given by interviewees during interviews. These include national reports and some working papers. Documents related to climate change created by research institutes or scientific bodies like the EEA are mostly available online. The EU also has an online archive for the history of the EMU, which is helpful for my case study on the EMU fiscal rules.[8] Some other historical

[7] Council of the EU, 'Archives' <http://www.consilium.europa.eu/documents/archives?lang=en> accessed 30 June 2015.

[8] Commission, 'EMU: A Historical Documentation' (archived on 17 January 2014) <http://ec.europa.eu/archives/emu_history/index_en.htm> accessed on 30 June 2015.

documents are found in the Central Library of the European Commission, the library of the EEA and the European Documentation Centre of the Bodleian Law Library.

2. Interviews

A total of 38 semi-structured interviews, with 35 interviewees, were conducted. Since anonymity was guaranteed during the process of interview, names of the interviewees are replaced by 'fake initials' and the exact locations of interviews are not listed (Table A.1).

Interviews were audio recorded with the consent of interviewees, although some interviews (mainly those related to the euro case) were conducted in an informal setting and thus not recorded. Most experts were interviewed individually, with only a few exceptions of interviewing two people at the same time or unrecorded informal interviews. Audio records of the interviews were transcribed into text files for further analysis. Some transcriptions were outsourced to professional transcribers, but also proofread and reviewed by myself before analysis.

Interviewees were selected by convenience sampling (through contacts that are accessible) and snowball sampling (though the introduction of other interviewees).[9] A one-page introductory statement was provided to interviewees before interviews, noting the context of my research and five key questions: the history of the 2-degree climate target or the EMU fiscal rules, the types of risk discussed by experts, the concepts relevant to the risk discussion, the culture/atmosphere of discussion, and the interviewee's opinion on risk communication. A more detailed interview guide with various sub-questions was prepared for conducting interviews. The actual questions

[9] Alan Bryman, *Social Research Methods* (4th edn, OUP 2012) 201–203.

asked in interviews remained flexible and depended on the interactions with and stories of individual interviewees. The length of most interviews was between 30 to 60 minutes. The introductory statement, the interview guides and the research plan were submitted to and approved by the Central University Research Ethics Committee and the Social Science Division of the University of Oxford.

Table A.1: List of interviewees

No.	Initials	Date	Note (past/present affiliation)
Climate case			
C1	ES	2013.03.12[†]	EEA Task Force; EEA
		2013.09.02	
C2	CM	2013.07.10[†]	Dutch national expert; EU Delegation to the IPCC; EU expert group on climate
		2014.04.02	
C3	BN	2013.08.16[†]	EU expert group on climate
C4	JI	2013.08.25	EU Delegation to the UNFCCC
C5	KA	2013.08.26	Danish Environment Ministry
C6	AI	2013.08.28	EEA; Dutch RIVM
C7	GF	2013.08.28	PIK; EEA
C8	KS	2013.08.29	EU expert group on climate; University of Copenhagen
C9	BM	2013.09.02[‡]	Greenpeace; EEA
C10	TD	2013.09.04	Finnish Environment Institute (SYKE)
C11[*]	BK	2013.09.05	Finnish national expert; University of Helsinki
C12	JP	2013.09.06	EU expert group on climate
C13	QH	2013.09.06	EU Delegation to the UNFCCC
C14	SK	2013.09.06	EEA-TF; Finnish Meteorological Institute
C15	KT	2013.09.30	PIK; WBGU
C16[*]	DK	2013.09.30	PIK
C17	UG	2013.10.01	EU Delegation; German Environment Ministry
C18	SS	2014.03.31	RIVM; Dutch Environment Ministry
C19	KX	2014.04.01	EEA-TF; RIVM; PBL
No.	Initials	Date	Note (past/present affiliation)

Euro case			
No.	Initials	Date	Note (past/present affiliation)
E1	NW	2013.03.11	Commission DG II
		2014.03.11‡	
E2*	JM	2013.04.08‡	ECB Archives
E3	NS	2013.04.08	CoG; ECB
E4	PQ	2013.04.08	CoG; ECB
E5*	LM	2013.04.15	National Bank of Belgium (NBB)
E6	NM	2013.04.16	DG II; IGC
E7	JC	2013.04.16	DG II; MC
E8	CS	2013.06.27	Belgian Finance Ministry
E9	LQ	2013.06.27	Commission DG II
E10	KK	2013.06.27	Commission DG II; MC
E11	IN	2013.07.03	Commission; NBB
E12	MT	2013.08.27	Delors Committee; University of Copenhagen
E13	HG	2013.08.27	MC Alternates
E14	WG	2014.03.11‡	MC
E15	HR	2014.04.04	Commission DG II; MC
E16	EV	2014.06.03	External expert of UK ministry
No.	Initials	Date	Note (past/present affiliation)

* Interviewees not directly involved in the process of making the risk regulatory standards
† Skype/telephone interviews
‡ Interviews conducted in an informal setting (i.e. not audio recorded)

3. Data Analysis

Interview transcripts and archival records were compiled and analysed in NVivo 10. The analysis was done through multiple phases of coding: an initial coding that reviewed the data line by line and assigned detailed codes, which was followed by more focused coding that grouped different codes together and created common themes, concepts and categories.[10]

[10] The process of my analysis may look similar to some called 'grounded theory', although the exact definition of grounded theory is contested (ibid 567–578).

This coding process eventually led to *thematic analysis*,[11] by matching the four 'analytical dimensions' of inter-expert risk communication to the four 'features' of risk conceptions in the two case studies.

The 'themes' discovered through this two-stage coding process were triangulated by comparing results from different sources of data, i.e. by checking whether both archival and interview data suggest the same findings. The coding, re-coding and final verification were mainly done on the NVivo platform, which not only allowed me to group together different pieces of data related to a common theme, but also facilitated my writing process in terms of reviewing and selecting the most representative contents to be included in the thesis. This DPhil thesis is therefore written from the perspective of a 'thematic approach', in order to present the findings of my analysis and two-case comparison in a way that is natural and close to the actual process of original data analysis.

[11] ibid 578–581.

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